Class
Book

BEAUTIFUL BIRDS:

Their Natural History;

INCLUDING AN ACCOUNT OF THEIR STRUCTURE, HABITS, NIDIFICATION, ETC. ETC.

EDITED, FROM THE
MANUSCRIPT OF THE LATE JOHN COTTON, ESQ., F.Z.S.,

BY

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ADVERTISEMENT.

THE first volume of this work comprised an outline history of the Raptorial Birds, together with that of the Dentirostral tribe of the Insessorial Order. In the present we lay before our readers the remainder of the Insessorial Order, comprising the several Tribes, Fissirostres, Scansores, Tenuirostres, and Conirostres. The whole work will be completed by the publication of the third volume, which will comprehend the Orders Rasores, Grallatores, and Natatores: orders in which are placed several domestic and wild families well known and valued in this country. We, therefore, confidently expect that it will possess, for the majority of our readers, greater interest than the portions already published.

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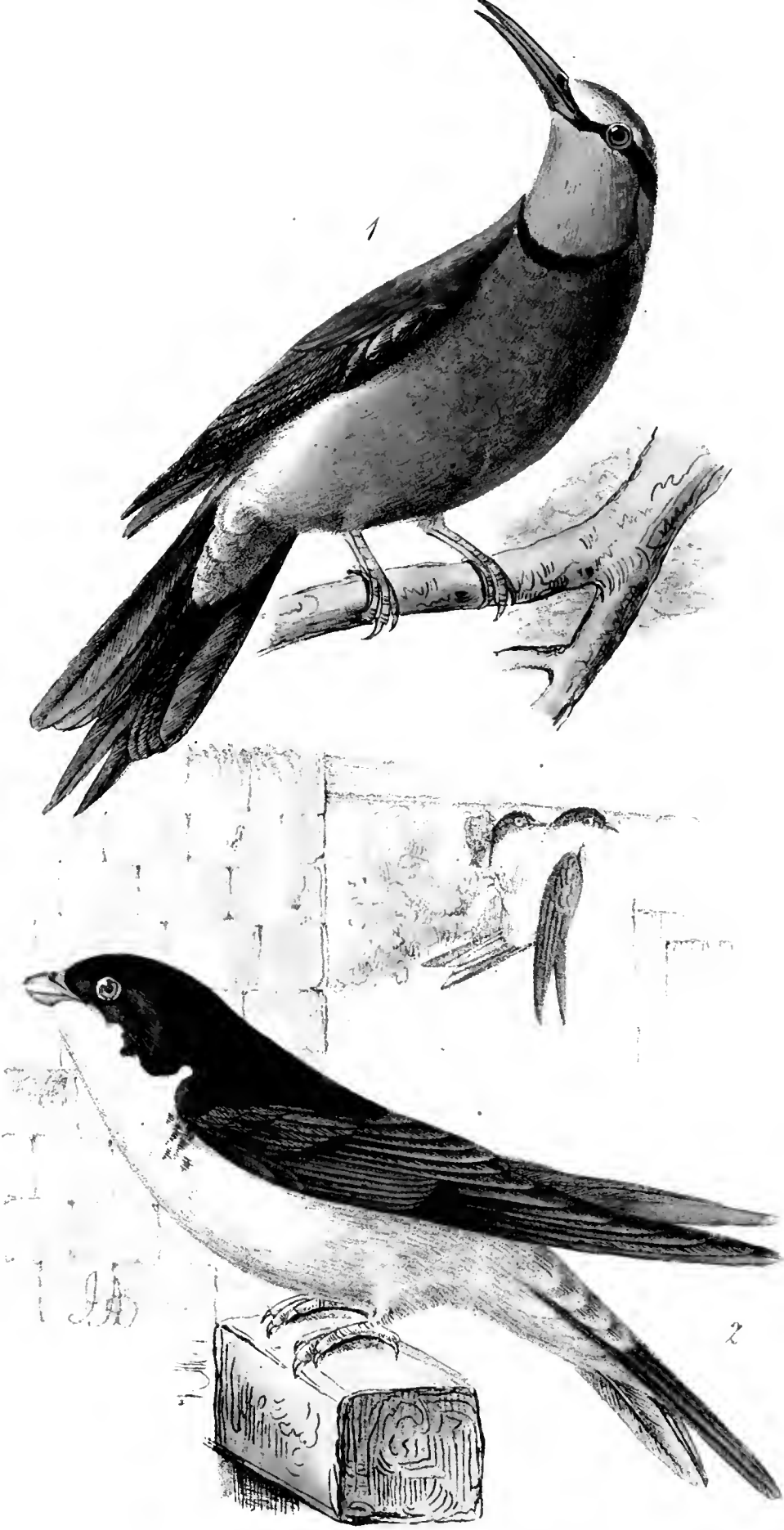


N°1. The Bee-eater. N°2. The Swallow.

BEAUTIFUL BIRDS.

Bee-eaters and Swallows.

FISSIROSTRES.

THE birds now under consideration are distinguished from the *Dentirostres* by a very wide gape, together with a weak conformation of legs and feet; and further by their extraordinary powers of flight, and by feeding exclusively (the typical families at least) upon insects, which they capture during their flight. So little occasion have they to use their feet, that these members appear modified and diminished to the utmost extent, and only capable of serving as a support to the body when at rest. A great diversity of structure is, however, observed among the different groups of perching birds which constitute the division *Fissirostres*. The whole tribe is divided into the following families, namely, *Meropidæ*, or Bee-eaters; *Hirundinidæ*, or Swallows; *Caprimulgidæ*, or Goat-suckers; *Trogonidæ*, or Trogons; and *Halcyonidæ*, or Kingfishers.

The connecting links between the *Meropidæ* and the *Muscicapidæ* (Flycatchers) appear to be the genera *Gubernetes* on the side of the last-named family, and *Eurystomus* on that of the Bee-eaters. The latter genus contains the Swallow-rollers of India, Africa, and Australia, splendilyd clothed in sea-green and vivid blue plumage. To these succeed the true Rollers (*Coracias*), natives of the Eastern continent, with splendid plumage and, generally speaking

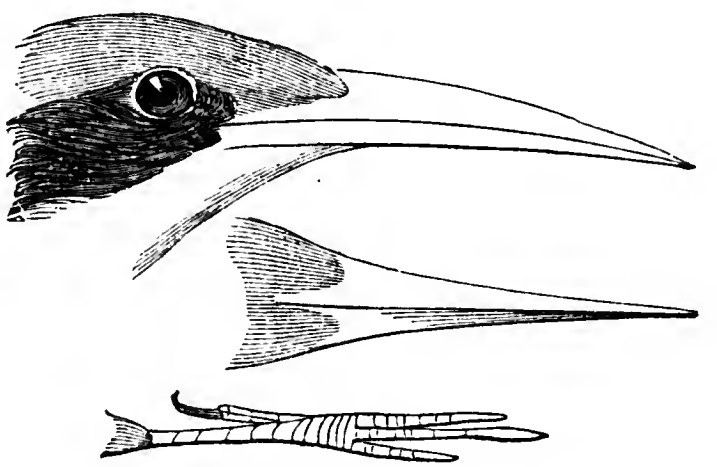
handsome forms, but their voice is harsh and disagreeable. They inhabit the depths of forests, and are not, therefore, often observed. Their general conformation would induce the idea that they feed upon the wing, and not upon the ground, as has hitherto been supposed. Their generic characters are: Bill of mean length, higher than broad, compressed, straight; the upper mandible bent at the point; gape wide; nostrils basal and lateral, half-covered by a membrane, which is furnished with stiff, bristly feathers; wings long, acuminated, having the first quill shorter than the second, which is the longest in the wing; tarsus shorter than the middle toe; tail generally long, capable of spreading, and composed of firm feathers; feet short; all the toes free to their bases; inner toe the shortest.

A few accidental stragglers of one of the species, *Coracias garrula* (the Garrulous or European Roller), have at different times been taken in Great Britain. In Germany this species appears to be common; and it is also numerous in many parts of Sweden and Denmark. It is a bird of restless and fierce disposition, and very clamorous.

Mr. Swainson, in the second volume of his "Birds of Western Africa," referring to the Blue-bodied Roller (*Coracias cyanogaster*), says, if richness of colouring alone constituted beauty, this Roller would be the most splendid of all the birds of Western Africa. No effort of art can possibly do justice to those inimitable rich lines of ultramarine, beryl colour, and changeable fawn, with which it is ornamented; for there are no tints hitherto discovered, either mineral or vegetable, which will enable the painter to produce

their successful imitation. The total length of the bird is about thirteen inches. The whole of the head, neck, throat, and breast is enveloped, as it were, in a hood of very light drab, or fawn colour, glossed with green, which changes its tint in different directions of light; the drab sometimes assumes a warmer ferruginous tinge, while in others it seems changed into a light but dull yellowish-green; the front, chin, and eyebrows are paler, and almost white; a black mantle spreads over the interscapulars and the scapular-covers; the wings are of the deepest and most brilliant mazarine blue, except the basal half of the quills, which are of a light beryl or blue-green colour; the lower part of the back and upper tail-covers are deep blue, so also are the corresponding parts on the upper plumage, that is, from the breast to the vent; the tail is light sea-green, brightest beneath. The under wing-covers, and the breast-plumes close to them, are of the same turquoise green as the tail; bills and legs blackish.

The bill of the true Bee-eater, forming the genus *Merops*, is long, slender and slightly curved; triangular at the base, and having an elevated ridge on the culmen. Nostrils, basal, lateral, oval, and open, partly hidden by reflected bristles. Feet having the tarsus short, with



three toes before and one behind, the outer toe being joined to the middle one as far as the second joint; the inner one the same as far as the first. Claws small, curved; that of the hind toe the smallest. Wings long and pointed; the first quill very short, and the second the longest in the wing. The form of the tail varies with the species, being square at the end in some, forked in others, and in others, again, with the middle feathers produced; but in all the species it is of considerable length.

In the breast-bone of the Bee-eater the keel is very much produced, as in all birds of powerful wing, and extends the whole length of the sternum. This bone, Mr. Mudie observes, is very beautifully adapted to the habits of its owner. It combines great flying power: length for the support of a body habitually on the wing, and flexibility in the posterior angles, by means of which the bird can better thread its way among obstacles. And the birds of this and the analogous genera are all powerful, and long continued in their flight, although none of them are lofty fliers. Feeding chiefly upon winged insects by the banks of rivers, or over other humid surfaces in warm climates, where vegetation is luxuriant, they have to pursue their prey among twigs and branches, the pendent festoons of climbing plants, and the tall stems and large leaves of aquatic ones, so that while they pursue in a swift and smooth forward flight, it is also necessary that they should be able to guide and turn in all directions with the utmost freedom. This facility in turning is very necessary to birds which feed upon insects, many of which are them-

selves carnivorous, or hawk for their prey in the bushes or on the leaves, and others are to be sought for in the corollas of plants, into which they have plunged for the sake of the sweet juices which accumulate there.*

The plumage of these birds is extremely beautiful, rich and metallic in its lustre, and very firm in texture. They get their English name of Bee-eater from their food consisting principally of bees, wasps, hornets, and other insects of comparatively long and rapid flight. They dig holes to a considerable depth in the banks of rivers, wherein to deposit their eggs and rear their brood. Their feet, which are powerless in assisting them to find their food, or to aid in its capture, become effective instruments in excavating a hole in a soft bank for the important office of incubation. The young birds continue for a long time in the nest after they are hatched, and they are fed there by the parents. In proportion as the plumage that is to be produced is firm or lax, the time that their young remain in their nest is long or short. That of the partridge and plover is loose or downy, and the young are able to leave the nest almost as soon as they are hatched; but the plumage of the Bee-eater is compact and stiff, and some time is required for the production of the delicate tissue of vessels which is necessary for the firm structure of the Bee-eater's feathers. It is on these compact and firm feathers that the rays of the sun appear to act most powerfully, for they are generally the most highly coloured and lustrous; and those birds that are the most ex-

* Natural History of Birds.

posed to the action of the sun have the most gay and glossy plumage, and it is probable that the metallic lustre and smooth surface of the plumage of tropical birds is a provision against the powerful heat and light, which is reflected as well as decomposed by that refraction which shows the colours.

Bee-eaters are birds of warm, sunny climes, and of districts where sweet fruits are produced. They are not found in the New World, but appear to be represented in that continent by the genus *Prionites*.

One species, *Merops apiaster*, or European Bee-eater, has occasionally strayed into Britain. It is about eleven inches in length, the female being rather smaller than the male. The extent of the expanded wings is about seventeen or eighteen inches. The colour on the upper part is of a maroon red, fading into yellowish rust-colour on the middle of the back; the front of the head white, shaded with green; the eye-streak large and of a black colour; the quills and coverts olive-green; the neck golden yellow, marked in the middle with a half colour of black, and all the rest of the under part clear aqua-marine, or sea-green. The bill black and the feet brown.

In the south-east and eastern portions of Europe, these birds are not uncommon during the summer. On the approach of autumn, they collect together in large flocks, and depart for more southern latitudes.

It is so abundant in all the islands of the Archipelago and the Levant, as to be one of the most common summer birds. The climate of these islands is very fine, and as, from their comparatively small size, no part of them is at any great distance from

water, they abound with insects, which afford subsistence to all the species of insectivorous birds, especially those which prey on the wing.

In these islands, the species under consideration is as plentiful and as familiar in its habits as Swallows are with us, only it builds, or rather burrows, in banks remote from human habitations. But, in search of its food, it flies in the close vicinity of houses; and in Crete especially, the boys are said to angle for it in rather a curious manner. They catch locusts, or any of the larger winged insects which have considerable power of flight, fasten the insect to a crooked pin or small fishhook at the end of a line, and letting the insect fly from the window, retain the line in their hand. The insect mounts up and endeavours to escape, notwithstanding the weight which it has to drag after it; and the Bee-eater perceiving it in the air, snaps at it, is caught by the hook, and dragged home. This is perhaps one of the most singular modes of bird-catching, and yet anglers in this country sometimes catch Swallows involuntarily, in a manner nearly similar, by means of their artificial flies; and the writer has sometimes been astonished, in casting his fly, at throwing a Swallow on the water, instead of raising a trout.*

The flight of the Bee-eater much resembles that of the Swallow, though it is more direct, and less rapid. The nest is formed in the sandy bank of some river, or sometimes in mountain ridges where the soil is loose. The depth of the excavation, according to Latham, is six feet. The eggs, which vary in num-

* British Cyclopædia.

ber from four to six or seven, are white, and are deposited in a bed of moss, at the further extremity of the hole.

It may be thought unnecessary to enter at any length into the habits and character of the Swallows (*Hirundinidæ*), so familiar are they to every one from their being so constantly on the wing, such confiding, friendly visitors to our houses, and so strikingly active in their motions; but their powers of flight are so extraordinary, and their mode of capturing insects so different to that of any other bird, that we cannot pass by the consideration of their structure and economy. These birds are observed during summer, from morning dawn till twilight closes upon the departing day, flying through the air with the greatest rapidity; skimming the surface of water, or gliding swiftly on motionless wing; turning and doubling, and darting like an arrow from a bow, with so much ease that but little exertion appears to be made by any of their limbs. It is evident, however, that they have to support themselves in the air as well as to make progress through it—that muscles must be in action; and it is surprising that they so seldom appear to need repose. They are for ever on the wing. The Swifts, which get their common name from the rapidity of their flight, are generally sixteen or eighteen hours on the wing every day, at that time of the year when they have their broods. During these hours it has been computed that they cannot, on the average, move over less space than a thousand or twelve hundred miles. The rapidity of their flight must require constant exertion, which cannot be kept

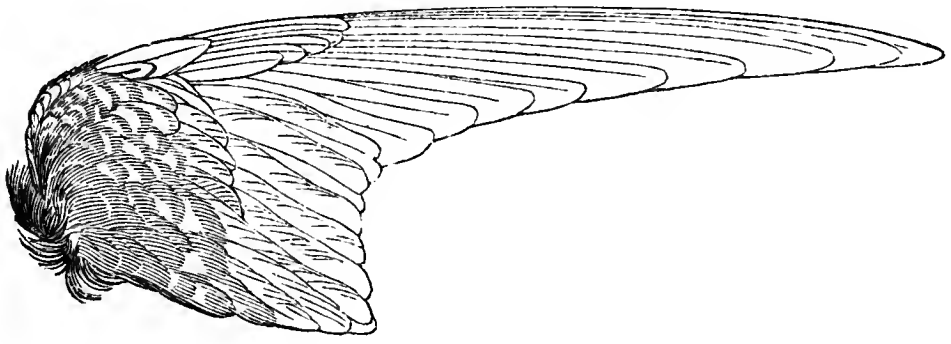
up without a proportionate waste and a reparation of that waste, which is effected in some degree by means of respiration. The auxiliary breathing which they have in supplement to the common action of the lungs no doubt prevents the exhaustion of those organs, and checks fatigue, by the buoyancy which it gives to the bird. Feathers that take much hold on the air would impede their progress, and be the very worst adapted for them, and accordingly all their feathers are firm aud smooth; so that constant exertion is required to preserve their elevation in the air.

The whole of the race are strictly insectivorous, and never destroy anything that is useful to man. How much they contribute to the preservation of many things that are valuable to him can scarcely be conceived, the number of insects that they capture being beyond computation. Many of the flies that are taken in the upper air by Swallows, are captured while winging their way for the purpose of depositing their eggs in situations where the grubs would be very injurious to vegetable life. Against these little depredators man has few direct defences within the range of his arts; and it is on this account that the insect-feeding birds, and the Swallows which obtain their food where no other birds can, are so very valuable, and are of such use in the economy of nature.

But let us see how the Swallow is enabled to perform these feats, and what is the modification of form and power requisite for such a purpose.

The general characters are readily perceived. They are all, observes a writer in the "British Cyclopædia," very thickly formed in the anterior part of their

bodies, so that the whole mass is concentrated on the axis of the wings, and they taper off in beautiful curves toward the posterior extremity. Their wings are long and pointed, and remarkably compact in their texture, so that they can undergo a great deal of fatigue without injury; they are acuminated, which is the form best adapted for rapid and long-continued flight. The first quill is generally the longest, although it sometimes happens that there is scarcely a percep-

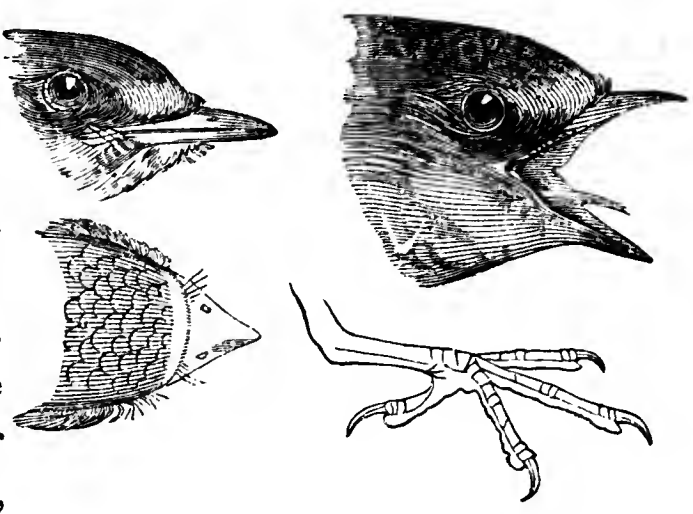


tible difference between that and the second; the rest, however, gradually but regularly, diminish at almost equal intervals until they reach the lesser quills, which are little more than one-third the length of the exterior primaries, the whole of which are very broad, but gradually taper at their extremities. The lesser (secondary) quills, on the contrary, are not only unusually short, but terminate so abruptly that they appear to have their ends cut off at that part; however, there exists in the middle a distinct notch, or sinuosity, to break the passage of the air—a structure which is only carried to its maximum in the Bee-eaters. The tertials are very little longer than the secondaries, and hardly exceed the shortest of the primaries. It is thus obvious that the whole power of the wing is

thrown into the ten principal quills, which are those chiefly employed in all birds to cut the air, but which in the present family are most particularly adapted for that purpose.*

The tails of the Swallows are produced, in general very stiff, and in most of the species very much forked. All the extremities of their apparatus of flight are in fact pointed, and they can turn on these points in a very singular manner, flying horizontally, or on edge, or at any intermediate angle, apparently with equal ease. The power of the tail appears to give them as much facility of ascent and descent as they have rapidity in forward flight; and as their prey is much more minute than that of even the smallest of the diurnal *Accipitres*, they are endowed with corresponding capacities for finding it.

It is natural to suppose that their sight is very acute. Their feet are extremely small and feeble as compared with the power of their wings, but they are not walking birds, and rarely alight upon the ground. Some of them have the feet with all the four toes to the front, or rather all so placed that the claws shall press toward the centre of the foot, where the joints of the legs are bent.* Their bills are short,



* Nat. Hist. and Classification of Birds. † British Cyclopædia.

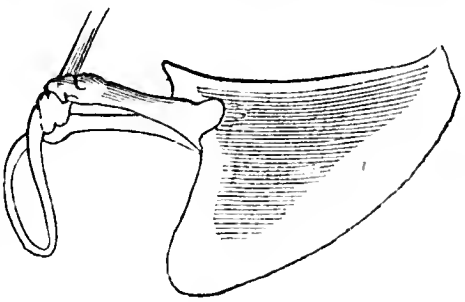
very broad at the base and much depressed. The upper mandible is generally bent at the tip, and carinated. Gape extending as far back as the posterior angle of the eye. The bill itself is small and weak, and totally incapable of acting as an instrument of defence against an enemy.

Many of the species, it is almost needless to mention, form the receptacle for their eggs of mud or clay; others of extraneous matters, agglomerated by a viscous liquid, provided from a glandular apparatus peculiar to such species. The nests of some exotic species, almost entirely formed of this viscous matter, are, it is said, highly esteemed as a condiment by the Chinese and other Eastern nations.

During their migratory movements the Swallows fly in immense flocks, and they also frequently breed in large societies. They are widely dispersed over the globe, and some of them are met with in almost all climates at certain periods of the year.

The young Swallow, like the young Bee-eater, remains in the nest for some considerable period after it is hatched, which imposes upon the parents a greater degree of labour in providing food for their young than is allotted to birds of less rapid flight. How beautifully, then, is the structure and capacities of the Swallow adapted to its necessities! without showing the least symptom of weariness, it dashes through the air with the utmost rapidity during the greater portion of the day, scouring a large tract of country in a very short space of time. It is thus enabled with ease to collect ample nutriment for itself, as well as for its callow brood.

The Swift (*Cypselus*) is one of the fastest flying birds, and also of long-continued flight. The sternal apparatus is represented in the engraving, which shows also its full, natural size. The keel, it will be observed,



is much elevated and pointed at the anterior angle, and as no particular strength is required in the clavicles and furcal bone, on account of the easy flight of the bird, those bones are slight in comparison with the corresponding portion of the anatomy of the Falcon, which is likewise a bird of rapid flight, but one that requires great strength in these parts to support the stress which the powerful action of the muscles in its momentary rush would impose upon those bones. The sternum of the Falcon is much firmer and more developed in the anterior part; it is shorter in comparison, narrower in the posterior part than in the anterior, and the posterior angles are perforated with holes. That of the Swift has the posterior part broadest, and the angles have no holes. In the sternum of the Swift, observes Mr. Mudie, we have the maximum development of that bone as a carrying basket in the air, but still accompanied with considerable power of wing, though the Swift never rushes, either by its power of flight or by a momentum of gravitation, like the eagle. Its sternum bears up the whole under part of the body, and thus it can remain longer on the wing without fatigue than any other bird with which we are familiar.*

* Natural History of Birds.

The Swift is the largest species of British *Hirundinidæ*. Its weight is remarkably small in proportion to the extent of its wings, the latter measuring eighteen inches, while the former is scarcely an ounce.

The form of the Swift enables it to be the most rapid in its flight of all the Swallow tribe. It may be said indeed to live upon the wing. When it does alight on the ground, which is rarely indeed, it can but crawl, on account of its short tarsi. The length of its wings also tend to keep it aloft, for they oppose themselves to its rising, which is difficult of achievement, even when attempted from moderate elevation, and it succeeds only after more than one or two trials. It may be said in truth never to settle willingly upon the ground. The sharp claws with which its toes are armed give it great capability for clinging to the slightest roughness on the front of rocks or sides of towers, in the dark crevices of which it hatches and rears its young. The Swift is the latest species of the tribe that comes to our shores and the earliest to leave them, remaining amongst us only from about the middle of April until August.

Around the thousands of village towers or spires which rear their venerable heads, amid trees often coeval with themselves, in our land, these birds may very commonly be seen wheeling in the fine mornings and evenings of the pleasant months of June and July. With a sharp scream they soar above our heads, dashing about round the angles of the building with amazing velocity. There is great interest in watching them; it is while on the wing that they feed and drink, collect materials for their nest, and enjoy their existence.

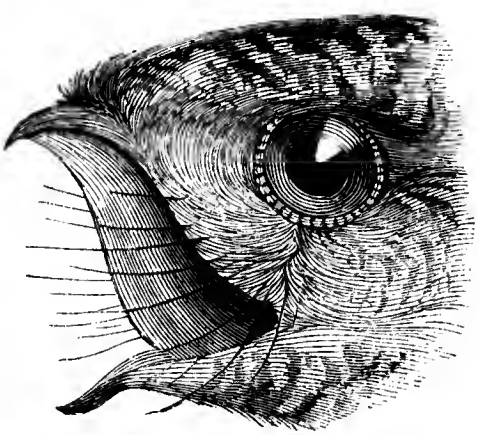
From dawn of morn till twilight has almost yielded to the darkness of the night do they thus float about, except the females, which in the hidden crevice of a rock or tower brood over their eggs; the male continually flits by the nest of his mate, uttering a scream as it glides along, which the hen answers by a low murmur of satisfaction.

The Swift forms its nest of dry grass and light straws interwoven, and held together by a viscous substance; it lines it with feathers, silk, and linen threads, picked from the ground in its rapid flight. The eggs are white, and from two to four in number. When the female has sat all day, she comes forth at dusk, relieves her wearied limbs by rapid evolutions, takes a scant meal, and resumes her work of incubation.

№1 The Nightjar. *№2 The Kingfisher.*

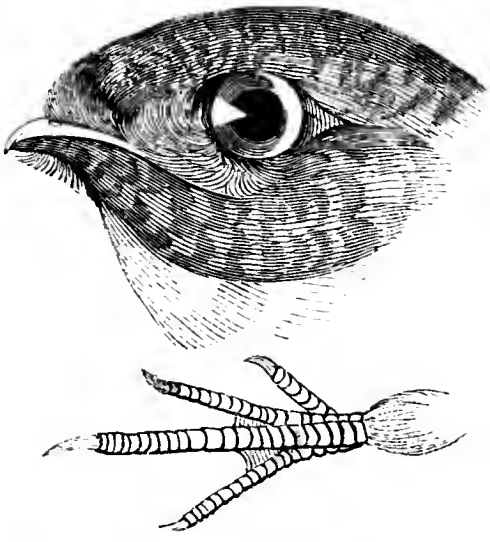
Nightjars and Kingfishers.

The *Caprimulgidæ*, Nightjars, or Goatsuckers, as they are more generally called, are birds of nocturnal or crepuscular habits. They are appointed to thin the numbers of those million-breeding and destructive *Phalænæ* and coleopterous insects that come abroad only in the twilight of still evenings, and in this respect the Goatsuckers somewhat resemble the Owls. Their plumage and visual powers are accordingly adapted to this habit, and as their prey is caught upon the wing in a manner similar to that of the Swallows, but consists of larger and more powerful insects, the greatest facility in securing the prey is given by a striking modification of the bill, or gape, and the production of a fence of stiff moveable bristles around its base. The fissure of the bill extends beyond the eye, and the base is extremely broad. The mouth is supplied with a glutinous secretion, which assists in quieting the prey when being conveyed to their young. The eyes and ears are large and prominent; and the wings, although, as well as the rest of the plumage, soft and of light texture, are powerful as instruments of flight, enabling the bird to turn and double in the air almost with the ease and rapidity of a Swallow. The feet are small and weak,



and the tarsi, which are generally covered with feathers, short. The toes are joined at their bases by a membrane; and the hind toe is partially united to the inner front toe, and in some species is directed forwards. The claw on the middle toe is broad, and often toothed or serrated on its inner edge.* The tail is generally long, even, rounded, or forked. Some of the exotic species are decorated with extraneous feathers, or other appendages, issuing from the wings, tail, or bill.

Most of these birds utter some peculiar cry, or whirring vibratory noise, which have obtained for them extraordinary names in imitation of the sound produced. In the fur countries of the northern parts of America the *Caprimulgus Virginianus* is a common species, and it ranges in summer even to the remotest Arctic islands. The gape of this bird is entirely destitute of bristles. The wings are remarkably long and



* The use of this pectinated claw of the Goatsucker has not been satisfactorily ascertained. It has been supposed by some naturalists to give a firmer hold of the perch; by others that it is of use in capturing the prey; and by others, again, that it serves as a comb to rid the plumage on the head or vibrissæ of vermin or particles of dust, or other substances that might adhere to those parts. It is probable, however, that it is used in confining the struggles of its prey, where too large or strong to be swallowed at once, until the harder portions are removed or the insect is deprived of life. It may likewise be used as a comb, and modified so as to suit the laxity of plumage of these birds.

Swallow-like, the first quill being the longest, the second being nearly of equal length, but the others diminishing rapidly. None of the quills are emarginate on either shaft, nor are the margins formed for a noiseless flight, but are entire, like that structure seen in the Swallows. The tail is forked.

This species, Dr. Richardson says, bears considerable resemblance to some of the *Falconidæ* in the evolutions it performs in the air, whence, in allusion to its food, it obtains the appellation of Mosquito-hawk, at Hudson's Bay. It often remains stationary for several seconds, fluttering its wings rapidly, and then suddenly shoots off a long way by a gliding motion, making a loud vibratory noise, resembling that produced by the vibration of a tense thick cord in a violent gust of wind. It also traverses the air backwards and forwards, quartering the sky as regularly as the Hen-harrier surveys a piece of ground. The total length of this species is upwards of ten inches. The eggs, as with most of the species, are deposited on the ground, without any nest being prepared for them.

The genus *Podargus* exhibits an aberrant form, the bill being of great strength and convexity, and the space around the eyes and base of the bill being furnished with radiating hairy feathers as in the Owls. In some the tarsi are elongated, and the middle claw is sometimes not serrated. A corresponding variation in the economy of the birds is made in accordance with these differences of structure.

In Britain we possess only a single species of the typical genus, *Caprimulgus Europæus*. Most of the

others are natives of the warmer climates of Asia, Africa, and America.

The name Goatsucker was given to this bird, or genus of birds, in early times on account of its supposed familiarity with cattle, and of its propensity to suck goats. The French call it *Engoulivent*, a name signifying "swallower of the wind," which is scarcely more appropriate than the former, though as the bird flies open-mouthed when feeding, and as its gape is very wide, a large current of air sets into its mouth and comes out again at the sides, making a peculiar booming or whirring sound, something like that made by the old-fashioned wheels used in hand-spinning wool. It has obtained some of its common English names from this sound, such as the "Wheel-bird," "Churn-owl," "Jar-owl," and latterly "Nightjar." It has also been called "Dor-hawk," partly, perhaps, from the sound which it emits having some resemblance to that made by the dor-beetle, and partly also from the number of those beetles which it captures. It has likewise been named "Fern-owl," from its proneness to hawk about the fern brakes in quest of its prey.

Considerable difference as to size exists in different species; but the colour of the plumage is very similar, and the various tints are so intermingled that the most laborious description must fail to convey any idea of it. The general colours are brown, grey, rufous, and whitish, disposed in a diversity of marks, bands, and spots throughout the plumage.

Goatsuckers are most numerous in those portions of the globe which are favourable to the production of the numerous hosts of insects that are only seen

abroad after sunset; and these are produced in the greatest profusion, Mr. Mudie states, where the seasons are strongly contrasted by alternating drought and rain. The former reduces the land to a state of desolation almost equal to that of winter, and the rains which follow stimulate both the vegetable and insect kingdoms to activity and health. At certain seasons in these latitudes the night air is literally crowded with insects, and the *Caprimulgidæ* are consequently present also to keep in check their too rapid multiplication. *Phalænæ* and beetles of large size are then upon the wing, and the open mouth of the Goatsucker, with its expanded fringe of vibrissæ, is ready to capture them.

It has been observed that the sounds which they utter are very striking; some have been thus amusingly described by Mr. Waterton, in his "Wanderings." Alluding to the birds of this family which inhabit Demerara, he says: there are nine species here; the largest appears nearly the size of the English wood-owl. Its cry is so remarkable, that having once heard it you will never forget it. When night reigns over those immeasurable wilds, whilst lying in your hammock, you will hear this Goatsucker lamenting like one in deep distress. A stranger would never conceive it to be the cry of a bird, he would say it was the departing voice of a midnight-murdered victim, or the last wailing of Niobe for her poor children, before she was turned into stone. Suppose yourself in hopeless sorrow, begin with a high-toned note, and pronounce *ha, ha, ha, ha, ha, ha, ha*, each note lower and lower, till the last is scarcely heard, pausing a

moment or two betwixt every note, and you will have some idea of the moaning of the largest Goatsucker in Demerara.

Four other species of Goatsucker articulate some words so distinctly that they have received their names from the sentences they appear to utter, and absolutely bewilder the stranger on his arrival in these parts. The most common one sits down close by your door, and flies and alights three or four yards before you, as you walk along the road, crying, *who-are-you, who, who, who-are-you.* Another bids you *work-away, work, work, work-away.* A third cries mournfully, *willy-come-go, willy, willy, willy, will-come-go;* and high up in the country a fourth tells you to *whip-poor-will, whip, whip, whip-poor-will.**

An American species, *Caprimulgus Carolinensis*, utters a cry in sound like *chuck-will's-widow*, which is its provincial name. Wilson says it is a solitary bird, arriving in Georgia in March, and in Virginia in April. Its cry is heard in the evening, soon after sunset, and with short intermissions is continued for many hours. As morning approaches the sound is renewed, and does not cease until day has fairly dawned. In the day it is not heard at all. It seems plainly to express the words which give its name, and each syllable is pronounced leisurely and distinctly, the chief emphasis being on the last word. When the air is still it is said to be heard at the distance of a mile.

The flight of this bird is low, skimming a few feet above the ground, frequently settling on old logs or

* Wanderings in South America.

fences, and thence sweeping around in pursuit of insects which fly at night. It is seen, says Audubon, sweeping over cotton-fields or sugar plantations, cutting all sorts of figures, mounting, descending, or sailing with so much ease or grace that one might be led to call it Fairy of the Night. Now it follows a road or path on the wing, and alighting here and there to pick up the beetle emerging from its retreat; again it rises high in air, and gives chase to insects floating there. At other times it poises itself on its wings opposite the trunk of a tree, and seizes the insects crawling on the bark, in this manner inspecting the whole tree, with motions as light as those by which the Humming-bird flutters from one flower to another.

The Trogons (*Trogonidæ*) resemble the Goatsuckers in several particulars. They live in the deepest and most gloomy shades during day, where they sit, almost motionless, on a dead branch. During the morning and evening they are more active; at these times they go into the more open parts of the forest, and taking a shady station, dart upon winged insects, particularly hard-coated beetles; at other times, says Mr. Swainson, they feed upon fruits, especially upon the rich purple berries of the different *Melastomæ*, at which they invariably dart precisely the same as if they were insects capable of getting away! The Trogons, like the Goatsuckers, have remarkably thin skins; like them they feed upon the wing; the feet of both are so short and feeble, as scarcely to be of any other use than to rest the body; the bill in both is remarkably short; the plumage in both is soft and loose; both

have the mouth defended by strong bristles, and both are most active during twilight.

Couroucou is the Brazilian name of these birds. They are peculiar to the hotter regions of America and of India, and its adjacent islands, Ceylon, Java, Sumatra, etc.; one species only having as yet been discovered in Africa. They are remarkable for the beauty and brilliancy of their plumage. The metallic golden green of some species is of dazzling effulgence; in others it is less gorgeous; the delicate pencillings of the plumage and the contrasted hues of deep scarlet, black, green, and brown produce a rich and beautiful effect.

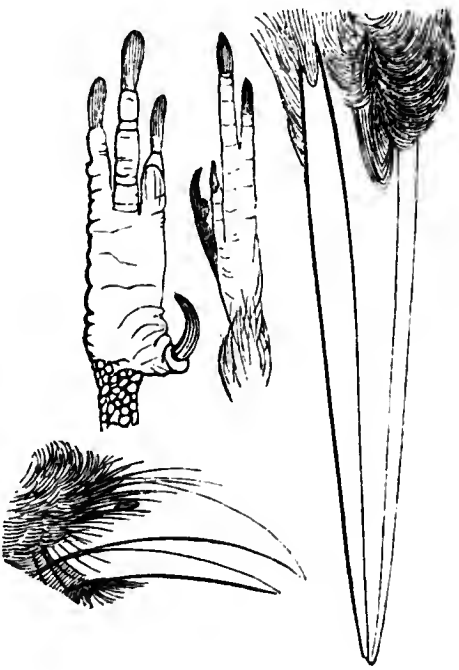
Trogons are *zygodactylic*, that is, they have their toes in pairs, two before and two behind. The anterior toes in some species are united, like those of the Bee-eaters, as far as the first joint. The tarsi are short and feeble, and generally feathered; the bill short, triangular, and strong, broad at the base, and the tips, and generally the margins of the mandibles, are toothed or serrated. The wings are short but pointed, the quill-feathers being rigid. The tail long, ample, and graduated, its outer feathers decreasing in length; in some species, and especially in that brilliant bird the resplendent Trogon, the tail-coverts are greatly elongated, so as to form a beautiful pendent plumage of loose wavy feathers.

Like the Parrots and Woodpeckers, the Trogons breed in the hollows of decayed trees, the eggs being deposited on a bed of wood-dust, the work of insects; they are three or four in number, and white.

Like the Trogons, the Motmots (genus *Prionites*)

have the bill toothed or serrated in its margins. The tongue is long and slender, and its sides ciliated so as to resemble a feather; feet like those of *Merops;* wings short, rounded; tail lengthened, cuneated. They inhabit shady forests, are solitary birds, and are usually found sitting nearly motionless, like other air-feeding birds.

The next family is one which presents peculiarly marked features; it is that of *Halcyonidæ*, or Kingfishers, containing the Puff-birds, Hermit-birds, Jacamars, etc. The whole of the genera, says Swainson, are sedentary, watching for their food from a fixed station, which they only quit when their prey approaches sufficiently near to come within the sweep of their wings; if unsuccessful in their first attack, they do not pursue their game, but return again to their post, and patiently wait for another luckless straggler; if their first attempt is successful, they return with their victim to the same station, and then proceed to swallow it.



These birds are remarkable for the great length and comparative strength of their bill, and the extreme shortness of their feet. The latter, although slight in structure, are beautifully adapted for grasping with a firm hold the extremity of a twig. The toes are either placed in pairs, versatile, as in *Cuculus*, or three in front conjoined, and one be-

hind. Some species have only three toes, two in front and one behind. The anterior toes are so united as to form a broad sole, and a stable support for the body on a slender twig or other perch. The bill is generally long, straight, and gradually tapering to a point, quadrangular in its section, and sometimes it is slightly curved. The wings are rounded; and the form of the bird is altogether short and thick.

The Kingfisher, it is well known, watches patiently from a fixed station, generally a naked twig overhanging water, for such fish or other prey as may come within its reach, and then, after a time, flies to another station, where it alights and remains. The manners of the Puff-birds, forming the genus *Tamatia*, are somewhat similar. They sit for hours together, Mr. Swainson says, on a dead or withered branch, from which they dart upon such insects as come sufficiently near. The Hermit-birds (*Monassa*) do the same, and frequently rise up perpendicularly in the air, make a swoop, and return again to their former station. Similar manners also belong to the Jacamars (*Galbula*), although their flight is weaker. They generally sit on low, naked branches in the forest paths, from whence they dart upon butterflies, spearing them with their long bill; their haunts, indeed, may frequently be known by the ground being strewed with the beautiful wings of their victims, the body of which they alone devour.

The flight of the true Kingfisher is rapid and direct. Their plumage, especially that of the typical group, *Alcedo*, frequently exhibits the richest and most vivid colours, with a metallic or varying lustre, as differently

presented to the rays of light. They are mostly natives of the warmer climates of the New World; one species only, *Alcedo ispida*, is indigenous to Britain.

They procure their food in a manner somewhat different to that of the Goatsuckers, Swallows, and Bee-eaters: let us then examine some of the peculiarities of structure by which they are adapted to their mode of obtaining food.

The feet, not being required for any other purpose but to rest the body, are very small, and the toes appear but imperfectly developed; there are generally three in front and one behind, but two of the former might be reckoned only as one, since they are united together even to the commencement of their respective claws; the inner toe is not half the length of the others, and seems rudimentary; it has a claw, and is rather more detached at its tip than the other two; in some, as in the three-toed Kingfishers, this inner toe disappears. The hinder toe (which is brought forward in the cut, to show its comparative length) is very short, and scarcely larger than the inner one; the scales of the whole foot are so thin and transparent, that they can scarcely be seen in the small species by the naked eye. Those who have seen much of the true Kingfishers, so scarce in England, but so common in tropical America, know that they never perch upon any other than small and slender branches, and this we might infer from the shape of the foot. The two outer anterior toes are very long, so that they would completely clasp two-thirds of the circumference of a small branch, the other third being em-

braced by the hinder toe; this fact is further confirmed by the unusual flatness of the soles of all, and by the acuteness of the claws, which, from being but slightly curved, would not, upon a small branch, come into contact with the wood; this union of the three anterior toes, by producing considerable breadth of sole, gives an unusual degree of steadiness to the bird, highly conducive to its remaining very long in one position. Thus we see that the foot of the Kingfisher, which at first appears so very imperfect, and so totally useless for ordinary purposes, is that which is most of all suited to the habits and wants of the bird.*

As it is usual for these birds to procure a considerable portion of their food from water, the general form of the Kingfisher is that which is best adapted for sudden plunges: the bill and head are large in comparison with the rest of the frame; but the former is long and pointed, and acts as a kind of fishing-spear, attenuated towards the point, and supported by the rounded wings, so ill adapted for long-continued rapid flight, but well suited to the dipping habits of their possessor. The plumage is of that nature which is impervious to water, and the powers of its sight are acute and quick.

The species of Kingfisher indigenous to Britain is *Alcedo ispida.* It is a splendid little bird, and its history is so replete with classical associations and poetic fictions, that it becomes an interesting subject in many respects. The very name of Halcyon (ἀλκυών of the Greeks) conjures up a thousand pleasing recollections of fabled legends that we have read in foreign

* Classification of Birds, Swainson.

tongues; of those quiet stilly states of the atmosphere when all nature seems to be lulled into a peaceful slumber, and one almost feels a disinclination to disturb the tranquillity which prevails around by drawing breath. It reminds us of those pleasant streams and brooks, those shadowed banks and waters where the speckled trout delights to revel; and of the transient pleasure that its vivid brilliancy of colour communicated to us when we first observed the Kingfisher darting like a meteor o'er the placid stream.

The Kingfisher, observes Selby, in point of locality is rather generally, though sparingly, diffused. It inhabits the banks of clear rivers and brooks, preferring those that flow with an easy current, and whose beds are margined with willows, alders, or close bushes. It is usually seen perched upon a small bough overhanging the stream, from whence it darts upon the small fish and aquatic insects that form its food.

Sometimes it will hover suspended (in the manner of the Kestrel and other hawks) over the water, and precipitate itself upon its prey, when risen to the surface. Upon making a capture it conveys the object to land, and, after beating it to death upon a stone or on the ground, swallows it whole. The bones and other indigestible parts are afterwards ejected in small pellets by the mouth. Its flight is very rapid, and sustained by a quickly-repeated motion of the wings, and is always in a straight and horizontal direction near the surface of the water.*

As it is requisite that the water should be clear and

* British Ornithology.

without a ripple, in order that the Kingfisher may see its prey, it is only at particular spots, in peculiar states of the weather, that its operations can be successfully carried on. When evaporation has ceased, and the brilliant bird can, if so inclined, view its reflected image in the water, then is the Kingfisher's harvest time; then is he out, and active.

As it is only on particular days and at particular hours, Mr. Mudie observes, that the Kingfisher can fish to advantage, he feeds abundantly at those times, and his gullet and stomach are ample in proportion; nor is it till after he has gorged to the very throat, or the fishing tide is at an end, that he retires to his hole. There he digests and dozes, and often remains for days before he again sallies forth; and when all the soluble matter is separated, he ejects the bones in those castings which are found in his den, and which, as they contain nothing but that which is capable of resisting the gastric juice of the bird, do not decompose in the air, so as to occasion the least unpleasant smell.

These birds breed in the banks of the streams they haunt, either digging a hole themselves, or taking possession of that of a water-rat, which they afterwards enlarge to suit their convenience. The bearing of the hole is always diagonally upwards, and it pierces two or three feet into the bank. The nest is composed of the above-mentioned pellets of fish-bones, ejected into a small cavity at the further end of this retreat, and upon which the eggs are laid, to the number of six or seven, of a transparent pinkish-white.

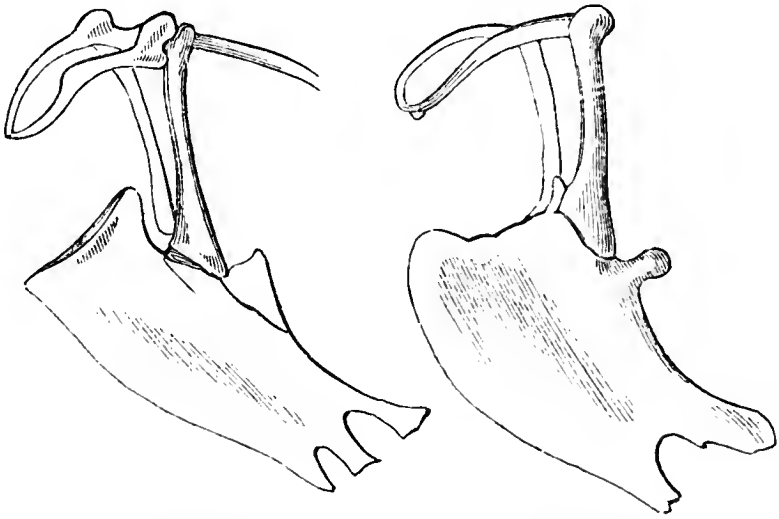
The length of the European species is seven inches;

there are some found in Africa which measure upwards of fourteen inches in length, and the little Rufous-cheeked Kinghunter (*Halcyon cyanotis*) measures only four inches and a half in its entire length. The Kinghunters have been separated from the preceding genus of late years, since their habits and structure have been better known. Their bill is generally very broad at the base, in some species even depressed; and instead of living upon fish, they seem to frequent forests for the sake of capturing small reptiles and insects. These birds are called by the French naturalists *Martin chasseurs*.

Mr. Swainson, in describing the little Rufous-cheeked Kinghunter, says that this superb little species may be called the gem of the family, both from its diminutive size and its exceeding richness of colouring. The crown of the head is occupied by an isolated broad patch of deep black, each feather having a transverse blue band across its tip, which gives this part the appearance of being lineated with ultramarine. From each nostril commences a large patch of rufous, which envelopes the base of the lower mandible, the ears, and the sides of the head, where it forms a broad stripe over the eye; this rufous encircles the neck above, and is glossed upon the ears, the nape and the maxillary stripe, with a most lovely lilac or violet colour; neither does it blend into the white of the throat, but terminates abruptly on its sides; the back scapulars and tail-coverts are uniform ultramarine blue; the wings and tail black, slightly glossed with the same; the wing-coverts are tipped with blue; chin and throat white; breast and all the remain-

ing under plumage rufous orange; bill and legs scarlet.

There remains to be noticed in the family *Halcyonidæ* the genus *Tamatia*, or Puff-birds, which are distinguished by having the bill slightly curved downwards towards the point; by the nostrils being defended by long, stiff, incurved feathers and bristles; the rictus being strongly bristled; the toes being in pairs, and the external hind toe versatile, or capable of being brought half-way forwards. The large head, short tail, and great bill of these birds, says Cuvier, give them a stupid appearance. All the known species are from America, and live on insects. Their natural disposition is sad and solitary.



Kingfisher. Nightjar.

№1. The common Cuckoo.

Cuckoos.

SCANSORES.

The term *Scansores* is applied to that tribe of birds which indicate, by the structure of their feet and other characters, the grasping and climbing qualities which distinguish them from all others, and are so prominently conspicuous in the typical groups. Their powers of grasping, holding on, and climbing are so highly developed, that they may be considered the typical group of the perching birds. The powers of their feet are not divided; they have no facility of progress upon the ground, but their feet are exclusively formed for making way among the branches of, and climbing about trees. The general disposition of the toes is in pairs, that is, two before and two behind; but there are several modifications of form in feet having the toes so disposed, each being accompanied by a corresponding difference of function. Thus the Parrot's foot is termed *prehensile:* the soles are remarkably broad, and the toes divided to their origin; the two exterior toes are the longest, one of which is decidedly in front, while the other, although almost always directed backwards, can nevertheless be brought halfway in front, so as to make a curve outwards. If a Parrot were to grasp a perfectly round fruit, its four toes would hold it at four points of its circumference, and at four equal distances; thus it is that these birds have the most varied powers of prehension in their

feet of any of the *Scansores;* for, when assisted by their bill, they can not only climb, but feed with their feet, this latter faculty being denied to all other groups. The Toucans, Cuckoos, and Puff-birds have the arrangement of the toes like unto the Parrots, but there is no breadth of sole, the tarsus is much more lengthened, and the toes, instead of being thick and strong, are slender and weak. These birds never climb, but as they sit much and often very long upon branches, it is necessary that their feet should be of such a form as to enable them to preserve an equal hold on all sides; we accordingly term their feet *grasping*. The Trogons exhibit another modification of structure in their feet, their toes are placed two before and two behind, but the posterior ones are altogether incapable, from the manner of their insertion, of being moved from their ordinary position, and they might therefore be termed the only birds whose toes are absolutely in pairs; but they are by no means scansorial birds, and as they are perhaps the most sedentary birds in creation, their feet, which are also the weaker, seem to be constructed for the sole purpose of sitting still. These are termed *gressorial* feet.*

The true scansorial foot, according to Mr. Swainson, is seen only in the Woodpeckers. The toes of these birds are arranged in pairs, and the outer hinder toe appears capable of a partial lateral motion, which assists the bird when climbing the bole of a tree. On flying from one tree to another, the Woodpecker generally alights upon the upright stem rather than upon a horizontal branch, and immediately begins, in

* Classification of Birds.

a perpendicular attitude, to explore the bark, and detect the external signs that may appear of its insect-food lurking within.

But there are other forms of climbing feet besides that of the Woodpecker, equally adapted for perpendicular ascent, having three toes in front and one behind, the hinder one having its claw lengthened and more powerfully developed; these will be noticed when we consider the family *Certhiadæ*, or Creepers.

Birds of very different form, size, and appearance are brought together in this tribe; we have the Cuckoos (*Cuculidæ*), the Toucans (*Ramphastidæ*), the Parrots (*Psittacidæ*), the Woodpeckers (*Picidæ*), and the Creepers (*Certhiadæ*). According to this arrangement, the Cuckoos and the Creepers form the aberrant groups, while the Parrots hold the typical station, which, from the intelligence they display, their great facility of climbing about trees, and moreover their peculiar and distinct characters, which render them the most isolated group of the whole class, we consider them most fit to occupy. The Woodpeckers and Toucans therefore fall under the denomination of sub-typical groups.

In writing of the *Fissirostres*, we were engaged with that form of birds more particularly adapted for feeding upon winged insects which are caught in the air; here we have to consider a very different development of form and powers. In the fissirostral birds, where the feet were not required to assist them in procuring their sustenance, those members were comparatively feeble, and their only purpose we observed was to support the body upon a perch whilst the bird

was at rest. In the present group the feet become essential instruments in aiding the birds to maintain a footing in those places where their food is alone to be procured, and their size and strength are proportionally developed. The bill, instead of being weak and broad at the base, in order to be serviceable in catching without injuring the flying insect, is much compressed and strengthened; so much so, that some of the species are enabled to strike with it against the bark of a tree with considerable force, and to excavate a hole in the solid wood. It becomes a serviceable instrument, in some instances, in assisting the progress of the bird amongst the branches, as efficient as the foot itself, and is employed in extricating from the hard shell the kernel of fruits. In the aberrant group, leading into the succeeding tribe of slender-billed birds, *Tenuirostres*, the bill is attenuated and of a delicate structure, and the toes are arranged in a similar manner to the generality of insessorial birds; thus exhibiting an approximation to the suctorial order of the *Tenuirostres*, and continuing the chain of progressive affinity.

The generic characters of the family *Cuculidæ*, by which we enter the tribe of scansorial birds, cannot be well defined, so as to include the whole of the genera, on account of the diversity of form that obtains amongst the members of it. The bill is generally slender, somewhat compressed, broad at the base, and, in the typical species, slightly curved, the lower mandible following the curve of the upper; the nostrils basal, round, and margined with a prominent membrane. The legs short, toes arranged in pairs;

the external hind toe capable of being brought halfway forward. The tibiæ are clothed with long feathers and the tail is rather long, always more or less wedge-shaped, and strongly fortified by coverts. The character of the plumage is firm and thickly set. The hues of the more typical species are in general rather sombre, but a few African species exhibit a brilliancy of colour rarely equalled in the feathered race.

So faintly is the scansorial structure indicated in these birds, says Mr. Swainson, that but for their natural habits, joined to the position of their toes, we should not suspect they were so intimately connected with the more typical groups of the tribe as they undoubtedly are. They neither use their bill for climbing, like the Parrots, nor for making holes in trees, like the Woodpeckers ; neither can they mount the perpendicular stems like the *Certhiadæ*, or Creepers, and yet they decidedly climb, although in a manner peculiar to themselves. Having frequently seen different species of the Brazilian Cuckoos (forming part of the genus *Coccyzus*) in their native forests, I may safely affirm that they climb in all other directions than that of the perpendicular. Their flight is so feeble, from the extreme shortness of their wings, that it is evidently performed with difficulty, and it is never exercised but to convey them from one tree to another, and their flights in the thickly-wooded tracts of tropical America are of course very short ; they alight upon the highest boughs, and immediately begin to explore the horizontal and slanting ramifications with the greatest assiduity, threading the most tangled mazes, and leaving none unexamined. In

passing from one bough to another they simply hop, without using their wings, and their motions are so quick that an unpractised observer, even if placed immediately beneath the tree, would soon lose sight of the bird. The Brazilian hunters give to their Cuckoos the general name of Cat's Tail; nor is the epithet inappropriate, for their long hanging tails, no less than their mode of climbing the branches, give them some distant resemblance to that quadruped. I have no doubt that the great length of tail possessed by nearly all the Cuckoos is given to them as a sort of balance, just as a rope-dancer, with such an instrument in his hands, preserves his footing when otherwise he would assuredly fall. Remote, then, as the Cuckoos unquestionably are from the typical *Scansores* (the Woodpeckers, according to Mr. Swainson), we yet find the functions of the tail contribute to that office, although in a very different mode to that which it performs among the Woodpeckers, the Parrots, and the Creepers.

The toes are placed in pairs, that is, two directed forward, and two apparently backward; but a closer inspection will show that the latter are not strictly posterior, and that they differ so very materially from those of the *Picidæ* as clearly to indieate a different use. The organization of the external posterior toe of all the Woodpeckers, Parrots, and Toucans renders it incapable of being brought forward, even in the slightest degree; whereas in the Cuckoos this toe can be made to form a right angle with that which is next to it in front, from which circumstance it has been termed *versatile:* this term, however, is not strictly correct,

inasmuch as the toe connot be brought more than half-way *forward*, although it can be placed entirely backward. The Cuckoos, in fact, are half-perching, half-climbing birds, not only in their feet, but in their manners.*

Cuckoos are never found in other than warm and temperate climates. Two species only are known to resort to Europe, and these never show themselves in our quarter of the globe, except in the warm season. Tropical countries and those which approach the equator afford the greatest number of species.

The food of the Cuckoos consists principally of soft fruits and soft insects, especially the latter, and more particularly when they are in the larva state. Most of the species are migratory, and the more typical species fly with strength and rapidity.

Although the common European Cuckoo (*Cuculus canorus*) is so generally known from its singular *song*, and parasitic habit, as it is termed, of depositing its egg in the nest of another bird, and thereby imposing upon another species the duty and labour of hatching and rearing its offspring, we must enter into some detail concerning it, more particularly since some points of its economy are strangely different to the habits of most birds, others have been little noticed, and many still remain to be explained.

The form of the nostrils in the typical Cuckoo is very peculiar, and it is the opinion of Mr. Swainson that future observation will show this structure to be intimately connected with their parasitic habits. The nests of those species in which the Cuckoo deposits

* Magazine of Zoology and Botany.

her egg, we all know, continues that able naturalist, are built in the thickest and most central parts of trees and bushes, to discover which superior powers of smell have been given to the Toucans (which feed upon the eggs or young), and, in a less degree, are probably conferred upon the Cuckoos to facilitate their search after a foster-parent for their young. This peculiar-shaped nostril is restricted to such Cuckoos as are parasitic. The American and other species of the *Coccyzus* have the aperture of a lengthened oval shape, or in the form of a slit, and all we know of these birds sanctions the idea that they are not parasitic.

The Cuckoo arrives in this country about the middle of April, at least its well-known vernal call is heard at that time, sooner or later; however, this depends upon the temperature of the season, for should the weather be cold and inclement, though the birds may have made their appearance, their note is not uttered. It is the male bird alone, according to Mr. Selby, that repeats the well-known notes, the female making only a chattering noise. These birds leave us again towards the latter part of June, or the beginning of July. But the young birds are often observed to remain for a much longer period, even till September.

It is a general opinion that the Cuckoo does not pair, nor, according to the common acceptation of the term, is it a polygamous bird, but all of them live together in a promiscuous state of concubinage. Tied down by no duties of incubation, these birds are bound to no particular spot, but wander without control from place to place throughout the summer. It is

generally believed that this "vagrant Cuckoo" never does construct a nest, and that it always selects that of an insect-feeding bird wherein to deposit its egg. Among others the Hedge-chanter or Dunnock, the Reed-bunting, the Titlark or Meadow Pipit, the Pied Wagtail, the Yellow-hammer, etc., have been recorded as birds to whose charge the egg has been committed, but the first is said to be most commonly chosen. The nests of the Greenfinch, Linnet, Whitethroat, and even of the Wren, have been mentioned as the place of deposit. Whether the bird actually *lays* the egg in the nest has been doubted, and if the case of one having been assigned to the charge of the Wren be a fact, it is almost conclusive that she does not so deposit it in all cases, for the aperture of the Wren's nest is in the side, and not more than large enough to admit the Wren herself. The Cuckoo egg is remarkably small for the size of the bird, hardly equalling in this respect the size of the Skylark; it is therefore somewhat in proportion to the small nests into which it is commonly introduced. Its colour is white sprinkled with two shades of ash-coloured spots, mostly at the larger end. A Cuckoo has been observed to watch a pair of Wagtails constructing their nest, and ere the structure was yet completed deposit its egg. The following day the female Wagtail commenced laying, without disturbing the strange egg, which was hatched at the same time with the rest, and the young Cuckoo soon contrived to have the whole nest to itself.

It is a remarkable circumstance in the economy of the Cuckoo, that in its earliest infancy it should display so much ingenuity, prescience, or whatever it

may be termed, in ejecting from the nest, in which it has been by chance deposited, the natural and proper occupants.

As the young Cuckoo requires a much larger quantity of food than the young of those birds upon whose labour it must depend for support, the requisite quantity might not be obtained were the others permitted to remain in the nest, it is therefore instigated to expel them, and thus secure the undivided attention of its foster parents.

Naturalists have not yet been able to assign any satisfactory reason why the Cuckoo should be absolved from the labours of incubation. It may be that the mature birds are required to execute other important functions during the time that would be thns occupied.

The peculiar call-note of the Cuckoo appears to be affected by the state of the weather; during a long continuance of drought it gradually becomes more and more hoarse, till at length it seems to be uttered with considerable effort, and the first syllable of it is often broken into two or three. This defalcation in the Cuckoo's song was the occasion of the ancient poet, John Heywood, inditing the following epigram:—

> Use maketh maistry, this hath been said alway,
> But all is not alway, as all men do say:
> In April, the Koocoo can sing her song by note,
> In June, oftime, she cannot sing a note;
> At first, Koo coo, Koo coo sing still can she do;
> At last, Kooke, Kooke, Kooke; six Kookes to one coo!

The Romans considered the Cuckoo excellent eating. Pliny (lib. x. cap. 9) says that no bird can be compared to it for sweetness of flesh.

Of the genus *Cuculus* many species are enumerated, inhabiting different parts of the Eastern continent, but chiefly Africa, and varying in size from double that of our bird to less than one-half. The plumage of the smaller species is generally of a brilliant glossy green.

The genus is represented in America by that of *Coccyzus;* the individuals of which are smaller than the true Cuckoos, which they much resemble. The bill is, however, rather larger in proportion; and the tails longer and bare of feathers. Wilson gives the following interesting account of the habits of one of them.

A stranger, says Wilson, who visits the United States for the purpose of examining their natural productions, and passes through our woods in the months of May or June, will sometimes hear, as he traverses the borders of deep, retired, high-timbered hollows, an uncouth guttural sound or note, resembling the syllables *kowe, kowe, kowe, kowe, kowe,* beginning slowly, but ending so rapidly that the notes seem to run into each other, and *vice versa;* he will hear this frequently, without being able to discover the bird or animal from which it proceeds, as it is both shy and solitary, seeking always the thickest foliage for concealment. This is the Yellow-billed Cuckoo (*Coccyzus carolinensis.*) From the imitative sound of its note, it is known in many parts by the name of *Cow-bird;* it is also called in Virginia the *Rain-crow,* being observed to be most clamorous immediately before rain.

This species arrives in Pennsylvania, from the south, about the 22nd of April, according to Audubon,

singly; they return southward about the middle of September, flying high in the air and in loose flocks. They resort to the deepest shades of the forest, to the borders of solitary swamps, and apple orchards.

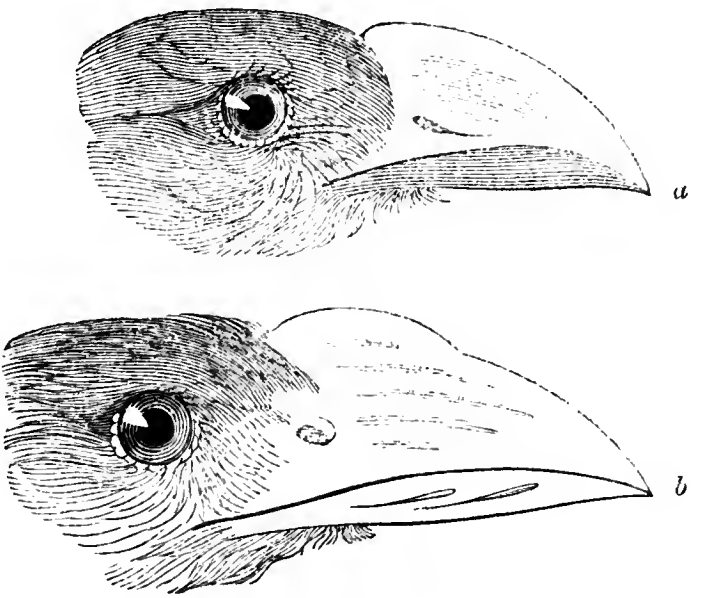
A pair of these birds seem to appropriate certain tracts to themselves, where they rear their young in the midst of peace and plenty. They feed on insects, such as caterpillars and butterflies, as well as on berries of many kinds, evincing a special predilection for the mulberry. In autumn they eat grapes, and I have seen them supporting themselves by a momentary motion of their wings opposite a bunch, as if selecting the ripest, when they would seize it and return to a branch, repeating their visits in this manner until satiated. They now and then descend to the ground to pick up a wood-snail or a beetle.

The nest is simple, flat, composed of a few dry sticks and grass, formed much like that of the common Dove, and, like it, fastened to a horizontal branch. Wilson says that the sticks and twigs of which it is composed are intermixed with green weeds and blossoms of the common maple. On this almost flat bed the eggs, usually three or four in number, are placed; these are of a uniform greenish-blue colour, and of a size proportionable to that of the bird. While the female is sitting, the male is generally not far distant, and gives the alarm by his notes, when any person is approaching. The female precipitates herself to the ground, feigning lameness to draw you away from the spot, fluttering, trailing her wings, and tumbling over in the manner of the Partridge, Wood-

cock, and many other species.* We cannot but contrast this affectionate display of parental feeling with the reputed conduct of the European Cuckoo.

The Gilded Cuckoo (*Cuculus auratus*) is an African species and abounds in Caffraria and Namaqua-land. Le Vaillant calls it Didric, in reference to its peculiar cry. In manner and form it is like our own Cuckoo. The female places her eggs in the nests of other birds, and if Le Vaillant's observations may be depended on, she conveys them to the chosen nests in her beak or throat.

This species is about seven inches long; the upper plumage is a rich glossy green with golden reflections; the head is striped with white stripes, with which also the secondary quills and many of the wing-coverts are tipped, the under parts are white.

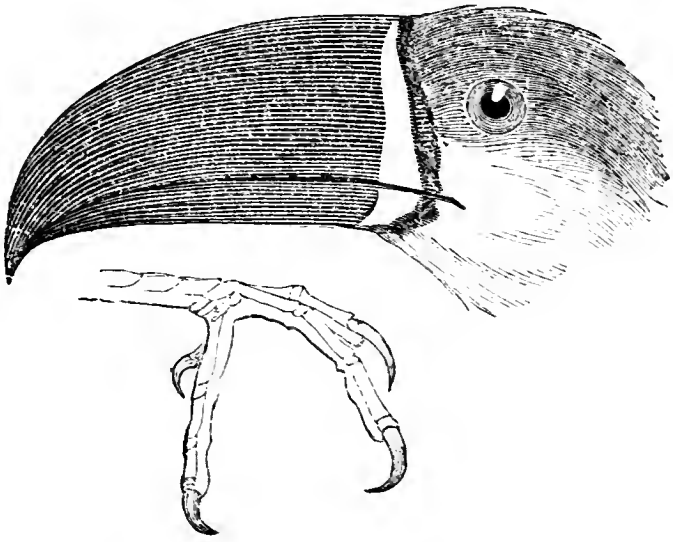


An approximation to the increased size of bill observed in the next family is exhibited in the Hornbill Cuckoos (*Crotophaginæ*.) The bills of *Phænicophæus* (*b*) and *Crotophaga* (*a*) are represented in the cut.

We now proceed to the second family of the *Scansores*, the *Ramphastidæ*, or Toucans. These birds

* American Ornithology.

are chiefly characterised by the enormous size of their bill, which gives to their appearance a very singular and uncouth character. It is generally as deep at its base as the head itself, and of even greater breadth. It is uniformly of considerable length, in some species equal to that of the whole body, convex and gently arched above, and notched along its margin, which is extremely thin, by a series of irregular crenulated teeth. Although of so large a size it is exceedingly light, being composed entirely of thin cellular plates of



bone, covered on the outside by a horny coating. A second equally remarkable peculiarity occurs in the structure of the tongue, which is of a firm cartilaginous texture, narrow, elongated, and furnished on either side with a continued row of fine slender processes closely approximated to each other, directed forwards, becoming longer towards the tip, and giving to the entire organ the appearance of a well-barbed feather. In the living birds, the bill is generally beautifully coloured with brilliant prismatic reflections; but the colours fade and the reflections go off entirely after

the bird is dead. The nostrils, near the base of the bill, partly covered by a horny lamina of it and surrounded by membrane. The feet stout, with four toes, two to the front and two to the rear; the front toes united as far as the first articulation, and the external one longer than the tarsus. The wings of mean length, concave and rounded, the third and fourth quills being longest; the tail-feathers ten in number.

Toucans make their way through the branches of trees, among which they constantly live, by hopping from bough to bough, their feet being more adapted for grasping, like those of the Parrots, than for climbing, like the Woodpeckers. They are mostly large-sized birds, of rich and glossy plumage, and their actions easy and graceful. The apparent disproportion of the bill, Mr. Swainson observes, is one of the innumerable instances of that beautiful adaptation of structure to use, which the book of nature everywhere reveals. The food of these birds principally consists of the eggs and young of others, to discover which nature has given them the most exquisite power of smell; these organs could not be developed under the ordinary form; the bill therefore is made so large as to contain an infinity of nerves, disposed like network, all of which lead immediately to the nostrils, and are protected externally by a thin horny covering; so that the bill, apparently heavy, is in reality exceedingly light, and is no inconvenience to the bird whatever.*

For our knowledge of the habits of these birds we are chiefly indebted to M. D'Azara. They are all of them natives of the tropical regions of America; and

* Classification of Birds.

subsist throughout the greater part of the year chiefly upon fruits. But they are also highly carnivorous, and attack the smaller birds in their nests, driving them away from their eggs, or from their young, which they afterwards devour at their leisure. Even the eggs and young of the Macaws and other equally large birds are stated occasionally to fall victims to their propensity for preying on the progeny of their neighbours. These delicacies form their principal nutriment during the season in which they are to be procured; but when that is passed away, the Toucans return to their vegetable diet, and never attempt, it is said, to molest the older birds. Their flight is low and heavy, and generally in a straight horizontal line. They perch in groups of eight or ten together, on the summits of the loftiest trees, and are seen in almost constant motion, hopping from branch to branch with the greatest quickness. In flying, the point of their beak is directed forwards, and this position, together with its extreme lightness, prevents it from overbalancing their body. Their tongue, from its flexibility, is quite useless as a means of guiding their food to its proper destination. It is for this reason that in feeding they first seize the morsel, whatever it may be, either with the sides or point of the bill, and then jerking it upwards in the air let it fall at once into their widely-distended throat. They build their nest in the hollows of trees, and lay but two eggs at a time.*

The predominant hue of the plumage of these birds is black on the upper parts, the lower portion being varied with either white, yellow, or red.

* Menagerie of the Zoological Society, Bennet.

N°1. The Papuan Lory.
N°2. The Carolina Parrakeet

Parrots.

There is not in the whole class of birds a more remarkable group than that which now claims our attention. Whether we regard the singularity of the habits of some, the gorgeousness and extreme variety of their colours, their clamorous chattering and screaming, their mischievous propensities, their dexterity in climbing amongst the branches of trees, or the intelligence that is apparent in the expression of their eye, we are amazed at their peculiarities, and can only compare them to the monkey tribe amongst the Mammalia, whose representatives they appear to be among the feathered race.

The *Psittacidæ* are an exceedingly numerous family. The greater part of them are forest birds, living upon the produce of the trees, though some of them are altogether ground birds, and find their food there. They are principally inhabitants of those countries that lie within the tropics, and are almost exclusively vegetable-feeders, the kernels of fruits and the buds of flowers of trees being the chief sources on which they depend for their nourishment; they could not therefore subsist in those countries where for several months in the year the trees are devoid both of leaves and fruit. The luxuriance of vegetation in tropical countries is very great, and there is a constant succession of food for the Parrots; but should this fail in one district, they are amply

provided with the means of conveyance to another, though that may be at a considerable distance. Their wings are long and powerful, and they occasionally perform long journeys, when driven by a scarcity of food to a different part of the country. Their peculiar construction is so beautifully adapted to their wants and to their haunts, that they are enabled to climb and scramble over the trees with the greatest rapidity, and to scrutinize every twig with the same perseverance as the ruminating animals show in browsing their pastures. They associate in large flocks, and although the depredations that they commit among the buds, flowers, and fruits may be considerable, we must take into consideration the prolific tendency of nature in these climes, and may conclude that a beneficial service is also performed by these birds in keeping under the destructive exuberance of the trees, whose luxuriance might otherwise be checked by the very excess of their own fruitfulness. The propensity to gnaw wood into chips, which they do, not for the sake of food, but apparently out of mere wantonness, no doubt answers some purpose in nature, and may, it has been observed, contribute not a little to the more rapid decay of dead trees, by enlarging the holes in their trunks, and thus rain is admitted and retained, and the tree is very speedily reduced to dust.

As we have before observed, the whole may be said to live upon vegetable food. Among the greater number this food is the kernels of fruits, and those fruits which have large seeds, enclosed in a hard shell or nut within the pericarp, appear to be the favourites

with them. They find these upon many of the palms, upon the wild almonds, and upon various other trees. In order to enable them to open the valves of these nuts, it is obvious that a peculiar mechanism must be required, as many of them are exceedingly compact and hard. This is not done by mere random force, but by an application of the powers of the bill, in a manner so perfect that the bird is enabled to break the shell and get at the kernel with a very small degree of labour. The bill is not a snapping bill, but works wholly by pressure; and its operations are assisted considerably by the short muscular tongue, which guides the substance to the most effective part of the mandibles.

The curvature of the upper mandible, and the cell at its base in some of the birds, give it somewhat the character of a rapacious beak, but it is applied to a totally different purpose. The notch in the upper mandible, observes Mr. Swainson, so analogous to that of a rapacious bird, is not used to tear the food, but acts as a rest for those hard nuts which are to be cracked and broken by the great muscular force of the under mandible.* When the shell or kernel is introduced into the bill, it is placed by the tongue against the hook of the upper mandible, in the very best position for the application of the lower mandible, by means of which the valves are to be separated. This is done solely by the touch of the tongue, for the bill has no sensibility, and it is impossible that the eye can be of any assistance. When the shell is broken, the tongue stlll presses the kernel against

* Classification of Birds.

the hook of the upper mandible, and thus allows the lower one to be opened, so that the fragments of the shell may be rejected.

For the accomplishment of this action in the lower mandible, it is supplied with a set of very powerful muscles, and it has a sliding or grinding motion, which differs with the degree of exertion. It is pushed a little forwards at the same time that it is raised by the muscles. The upper mandible has much less motion than the lower, but still it has more than in most birds.

To prevent any concussion which might be communicated to the brain, the upper mandible is articulated with the bones of the cranium, and not united. In consequence of this, the upper mandible is susceptible of some motion on its base; and this motion not only prevents the concussion from being propagated to the brain, but enables this organ to exert a much more powerful effect than it would have, if the upper mandible were so firmly united at its base as to be incapable of motion. The bill thus not only becomes a powerful crunching instrument, but is rendered effective likewise in taking hold with a firm gripe of small boughs, to assist the bird in its progress amongst them. To render the upper mandible more effective as a rest against the pressure of the lower one, the under side is slightly hollowed towards the hook, and roughened like a millstone, by means of angular furrows, with their apices directed towards the tip.

There are several variations in the form of the bill in this numerous family. The Paroquets have the

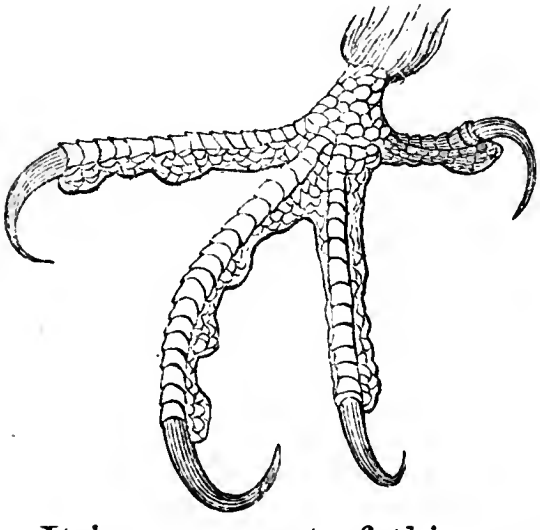
bill considerably smaller in proportion than the others, not exceeding one-third the length of the head, and not very broad, but it is firm in its texture, and perhaps proportionably the most powerful of any. The Parrots properly so-called, which are the most scandent, have it half the length of the head, and very thick and strong. The Cockatoos, which inhabit marshy places and live upon softer food than the others, have the bill feeble. The Maccaws, which use the wing more than any of the others, and find much of their food in the tops of forest trees, have the bill large, as long as the head, and very sharp pointed.

The tongue is likewise subject to considerable variation of structure. In most of the birds of this family it is thick, fleshy, and of uniform structure throughout; in others, it terminates in a brush-like bundle of filaments; and in a third modification, consists merely of a somewhat horny snbstance, supported by a cylindrical extensile and retractile pedicle.

An extensive modification of structure is observed in the feet of these birds in conformity with their peculiar climbing habits. Their articulations are so loose, and yet are so well supplied with muscular strength, that they have the most varied and firm powers of prehension of any of the *Scansores*. The toes are in pairs, but all of them are free to their bases, and the exterior hinder toe is capable of considerable lateral motion. The Parrot climbs, it is well known, by clutching with its feet, assisted by the gripe of its bill; and its pasture is among the sprays or smaller twigs of large spreading trees, which inter-

twine each other at the extremities of larger boughs. The bird has to make its way through this tangled brake by means of its prehensile limbs alone, as its wings would evidently be of little service here. Consequently the organization most essential to this habit is the one which enables it to get most readily from twig to twig without the use of its wings in any other way than partially opened, to assist in keeping its balance.

The foot, to possess this property, must have the whole of its prehensile action in the toes; and the legs, instead of maintaining one invariable position in assisting the foot in holding on (as is the case with the Woodpecker), must be free to move to its utmost stretch in all directions. It is also evident that unless the Parrot could hold on by one foot, and hold on with that foot in any direction, above it, below it, or laterally, it could not make its way.*



To accomplish these purposes, the joints in the leg and foot of the Parrot have a rolling or oblique motion in all directions, particularly outwards, as that is the position most required for readily laying hold with one foot, while the other retains its grasp.

It is on account of this peculiar adaptation of the feet to the climbing habits of the bird that the gene-

* Mudie's Natural History of Birds.

rality of Parrots are unable to walk with ease upon the ground. Some species there are which live habitually upon the ground, but these have much less motion of the joints at the articulation of the tarsus with the toes than is prevalent amongst the climbing Parrots. The tarsi of the ground Parrots are much longer in proportion, and the articulations of the toes are altogether firmer, so that some of the species can run upon the ground with a facility approaching to that of the gallinaceous tribes.

In the variety of their colours, few birds equal the Parrots; their plumage is generally of remarkable brilliancy and splendour. It is firm in its texture and not easily ruffled, qualities essentially requisite, considering the nature of their haunts. Their wings are powerful, though not altogether adapted to keep the bird in the air for any length of time. The feathers are not so constructed as to take hold on the air, like those of the long-flying birds. The tail varies in length and shape, but it is generally lengthened and wedge-shaped. Although in a state of nature they are wild birds, and are of little use to man, yet they are susceptible of being tamed, and, with proper treatment, may be kept in confinement for many years, when they show a very considerable degree of attachment to those who feed and are otherwise kind to them. Owing to the very great difficulty of approaching their haunts, but very little is known of the Parrot in a state of nature. It is known, however, that they inhabit forests; that many of them are social birds, often rising from the trees in large flocks, and laying the cultivated fields under pretty severe contributions;

that their principal food is vegetable; that they nestle chiefly in the holes of trees, having two broods in the year; and that they are very noisy withal: but this is nearly all that is known of these birds in wild nature.

The whole family has been divided into the following sub-families, viz., *Macrocercinæ*, Maccaws; *Psittacinæ*, Parrots; *Plyctolophinæ*, Cockatoos; *Lorianæ*, Lories; and *Platycercinæ*, Broadtails or Loriets.

The *Platycercinæ* compose Mr. Swainson's fissirostral division of the family, and are considered by him as analogous to the fissirostral tube of the *Insessores*. They are less arboreal in their habits than others of the family, and are distinguished, says Mr. Selby, from the rest of the *Psittacidæ* by their slender and elevated tarsi, and the less falcated form of their claws. Their wings also are shorter, and rounded, the first quill-feather being inferior to some of the succeeding ones. In consequence of this formation, their habits are less strictly scansorial than those of the typical Parrots; but the deficiency is amply compensated by the ease and agility with which they move upon the ground, where their actions partake in a great measure of that freedom which distinguishes so many of the scansorial order, but which is almost denied to the typical Parrots, whose movements upon a plain surface are to a great degree awkward and constrained. The *Platycercinæ* are birds of elegant and graceful form, and their carriage and actions are in accordance with it, as they display an activity and liveliness of motion far superior to that of the true scansorial species, and more in character with that of other birds. In richness and diversity of plumage also, they yield to none

of the tribe, whether we admire it in the varied hues of the genus *Platycercus* or in those smaller species belonging to the genus *Nanodes*, which have aptly been termed miniature Maccaws.

Even among the splendid family of the Parrots, Mr. Bennett observes, the Maccaws claim a pre-eminent rank for their superior size and the brilliancy and variety of their colours. They are at once distinguished by the nakedness of their cheeks, which are furnished at the utmost with a few minute lines of scattered hairs or feathers; by the great length and deep curvature of their upper mandible, and the extreme brevity of the lower, which latter is generally indented on either side with a notch of greater or less extent, corresponding to an elevated tooth in the former; and by the prolongation and regular graduation of their tail, which is larger than the rest of their body. The elegance of their plumage, the singularity of their deportment, their mildness of temper and docility in captivity, render them peculiar favourites; but they are by no means equal to most of the other divisions of the Parrot tribe in activity, in intelligence, in familiarity, or in the imitative power of their voice.

The Blue and Yellow Maccaw (*Macrocercus ararauna*) is one of the most conspicuous examples of the group. It is a large species (though not the largest of the Maccaws), measuring nearly three feet in length. Like all the other species of the group, it is a native of the tropical regions of America. It is fond of rich and marshy places, where it roosts generally on the tall palm trees, and lives in great part on their fruits. As is the case with its congeners, it generally keeps in

pairs, or at most in the family pack, for a short time after the young are capable of using the wing. It sometimes happens, however, that the rains fail or are later in coming than usual, and at such times the forest supply gives way, and their closest inhabitants are compelled to range abroad for subsistence. This is sometimes the case with the Blue and Yellow Maccaws, and where it is the case, they assemble in flocks, take a lofty flight, and give notice of their approach by the loudness of their scream. They are birds of very powerful wing, and have much command of themselves in the air. Their wings are very pointed, and their tail exceedingly long, stiff, and wedge-shaped. When they alight on their journeys, in order to rest for the night, or for a time, it is always on the tops of the loftiest trees, and they never alight without whirling round and round in the air, as if in order to ascertain whether any danger be near, before they take their repose; and while they are reposing it is generally understood that they have a watch set, which never fails to give timely warning in case of necessity.

Although they may inhabit the same localities with other species of the same genus, it is said that they never mingle with them, but, on the contrary, are at open war with them when they happen to meet, like two hostile marauding companies of troops.

They nestle in the holes of trees, have two hatches in the year, and two young at each hatch.

The colours of this species are remarkably distinct: all the upper parts, from the forehead to the extremity of the tail, including the sides of the head and the upper surface of the wings, are of a bright blue, with

a slight tinge of green; the under parts, from the breast downwards, are of a light orange-yellow; and the throat is of a dusky black, with a faint greenish shade. The blue of the fore part of the head has a more decided tinge of green. The naked cheeks have their white suffused with a slight roseate blush, and are marked by three, or sometimes more, transverse lines of minute blackish feathers. In the female, the colours are still more vivid, and the tail is also somewhat longer in proportion; but the relative size of the bird is a trifle less. The bill, which is remarkably hooked and pointed in the upper mandible, is black; the feet are dusky.

The Parrots, properly so called, and which are sometimes considered the typical group of the family, are distinguished by their comparatively stout and generally even tail. The bill, though very powerful and strong, is more elongated than in the Maccaws, and Cockatoos; the head is large, and the face, with some few exceptions, covered with feathers. The species are found distributed in Asia, Africa, and America, and are all inhabitants of the torrid zone. Many are gregarious, except during the period of incubation. They breed in the hollows of decayed trees, and most of the species are supposed to lay only two white eggs, which are incubated alternately by both sexes. In disposition they are the most docile of the family, and possess the power of imitating the human voice in as great or perhaps greater perfection than any of the other divisions.

Another group of this family contains the Cockatoos, so called from the usual call-note of the species .

They are readily distinguished from the other groups of the *Psittacidæ* by their light and uniform colour, which is white generally, or tinged more or less, according to the species, with sulphur-yellow or rose-red, by their peculiar-shaped crest, and by their short and even tail. The bill is massive and powerful. They are natives of Australia and the Indian isles, where they inhabit the woods and forests of those luxuriant climes. They feed upon the seeds of various trees and plants, being able, with their powerful bill, to break the stones of the hardest fruits. We are disposed to consider this the typical group of the family.

There is yet another division of the *Psittacidæ*, consisting of the Lories (*Lorianæ*), natives of continental India and its islands. Many of them are of great beauty and highly interesting manners; they are, however, more delicate in their nature than others of the family, and, owing to the very great difficulty of preserving them alive away from their native countries, where they are abundant, they are not often seen in Europe. The name "Lory," by which the whole are popularly designated, is, like the word "Cockatoo," the call-note of some of the species. Their principal colours are red and green. They have the general characters of the Parrots, but greatly modified in conformity with their difference of habit. The bill is still much hooked in the upper mandible, and the lower one is slightly arched in the ridge, but longer than it is deep. It is a much smaller bill in proportion than that of a Parrot, and is generally without a notch or tooth; the under side of the upper

mandible is without the strong palatal ridge and roughness which are observed in the Hard-mouthed Parrots, as they have been termed.

The tongue of the Lories is very different to that of the generality of Parrots; instead of being full and smooth at the point, it is slender, soft in its consistency, more or less covered with projecting papillæ, and sometimes these papillæ form an absolute brush at its extremity. We find a somewhat similar tongue in those birds of a different order which sip or sup the nectar of flowers, and we may conclude that such in part is the use of this structure of tongue in the Lories. The honey of flowers and the sweet juices of pulpy fruits are the substances upon which the Lories feed; and the countries which they inhabit abound greatly in such substances.

The plumage, instead of being firm and scaly, as in the Parrots, is soft and downy, excepting on the wings and their coverts, and is therefore less adapted to withstand exposure to rough usage either in the forest or the air.

One of the most beautiful species is the Papuan Lory (*Pyrrhodes Papuensis*); to great elegance of form this species unites a plumage of the richest description, the ground-colour of the body being of a deep but brilliant scarlet, relieved in parts with deep azure-blue, yellow, and green. The tail, or at least the two narrow central feathers greatly exceed the rest of the body in length, as they measure upwards of eleven inches, while the former does not exceed six; the lateral feathers are regularly graduated, as in the other Lories. The bill is of an

orange-red colour. The elongated tail-feathers are pale grass-green, passing towards the tips into pale yellow; the lateral have their basal half dark green, the remainder deep saffron-yellow. This lovely species is a native of Papua and other parts of New Guinea, but little is known of its history or peculiar habits.

There is a beautiful species, a native of New Holland, called the Blue-bellied Lorikeet *(Trichoglossus Swainsonii)*. It is found in large flocks wherever the various species of Eucalypti abound, the flowers of those trees affording an abundant supply of food to this as well as to other species of the nectivorous Parrots. It is an inhabitant of the plains, not of hilly districts; is called War-rin by the natives, and its flesh is highly esteemed. Total length of the bird, thirteen inches, of which the tail occupies six; bill orange-yellow; head and throat of a fine bluish-purple, the feathers rigid and subulate; lower neck and breast bright vermilion-red, passing on the side of the neck into rich King's yellow; middle of abdomen of a deep imperial purple, the feathers towards the sides vermilion, tipped with vivid green; hypochondria green, the basal part of the feathers marked with vermilion and yellow; tibial feathers vermilion-red; under tail-coverts, with the base of the feathers, red, the middle part yellow, the tips green; under wing-coverts rich vermilion-red; margin of the wings and all the upper plumage bright grass-green; the feathers upon the lower part of the back of the neck, with their bases, vermilion margined with yellow; tail, with the four middle feathers, entirely green, the remainder of the

lateral feathers, with part of the inner web, rich yellow, increasing in extent to the outermost, where the whole of the web, with the exception of a small spot at the tip, is of that colour; quills, with the inner webs, dusky, and each with a large oval central spot of King's yellow, forming a broad fascia on the under side of the wings; legs and toes grey, the lateral membranes broad; the claws strong and greatly hooked.* Such is the gorgeous plumage of this splendid bird.

The Carolina Parrot *(Psittacus Carolinensis)* is a native of the southern districts of the United States, frequenting the low alluvial grounds along the Ohio and Mississippi, where the cockle-bur *(Xanthium strumarium)* grows in abundance, on the fruit of which it feeds, extricating the seeds from the prickly shells; it adds, however, grain, fruits, apples, mulberries, grapes, etc., to the bill of fare, and as it associates in flocks, the farmer often suffers from its depredations. It must not be supposed that these flocks commit their ravages with impunity, the gun thins their numbers; and as the living birds sweep screaming around their dead and wounded companions, and settle again in the place of danger, the whole flock is sometimes almost entirely extirpated. The flight of this species is rapid, graceful, and direct, and a general cry is kept up by the whole party while on the wing. The movements of these birds on the ground are slow and embarrassed, but on trees or tall strong plants they are very active, climbing about and hanging in every attitude. They roost in hollow trees, and incubate in similar cavities, many females, as Audubon assures us, depositing their

* Naturalists' Library, vol. vi.

eggs together. From the same observer we learn that these birds are fond of saline earth, and visit the different salt-licks interspersed through the woods. They delight also in rolling themselves in the sand, for which purpose they often alight in flocks along the gravelly banks of rivers and creeks, and in other situations.

1. Three toed Woodpecker.
2. Red head Woodpecker.

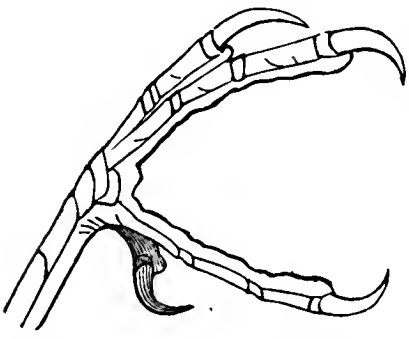
Woodpeckers.

The *Picidæ*, or Woodpeckers, are a very remarkable and numerous family. They are appointed to search for and subsist upon those insects or grubs which undermine the bark of trees, or bore into the sapless wood of such as are in a state of decay or have already ceased to derive nutriment from the ground. A remarkable peculiarity of character is given to these birds, to enable them to procure their appropriate food, which is secure against the attacks of every other bird or animal. The healthy tree has but little attraction for them, it is the aged, death-stricken tree that is the province of the Woodpecker. Here the insect tribes find ample room, within the interstices and chinks of the dried wood and bark, to spread and multiply their race, and perforate with their tiny jaws the solid trunk of the largest tree; and here it is that the birds of this family exert their peculiar powers and labour for their food.

In order that they may be enabled to procure these insects, it is evident that some extraordinary means must be resorted to. They have to climb the vertical trunk; to cling to the bark with a firm hold, whilst they are engaged hammering with their hard bill against the bark or wood, until they have disturbed

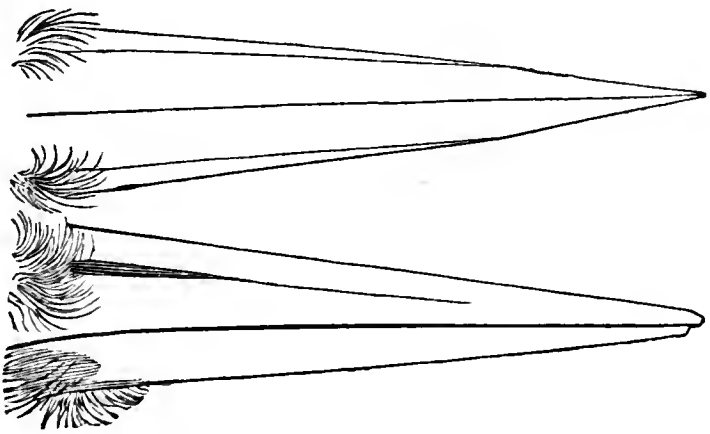
the insects, or punched away the intervening portion of the wood.

Considerable strength of foot and power of grasping or clinging is requisite, in order that sufficient support should be obtained for the body in its perpendicular or spiral ascent of the bark of a tree. We accordingly find that, although short, the Woodpecker's feet are remarkably strong; two toes are directed backwards, and two are placed in front, these latter being joined together at their bases, and the whole of them being firmly articulated at the joints. In the typical species, the exterior hinder toe is considerably lengthened, so much so as to be longer than the longest toe in front. The claws are strong and much hooked. Those in front serve to suspend the weight of the bird, and those which are directed backwards have their principal action in tightening the hold of them. As an additional support, the tail-feathers, which are remarkably firm in their texture, terminate in rather firm points, which being pressed against the bark are of very great assistance to the bird in his perpendicular attitude. The legs are placed behind the centre of gravity, so that the weight of the bird assists in compressing the claws in the fissures of the bark, and presses the tail against the tree under them; and while the centre of gravity remains higher than the feet the bird is stable, without that exertion of the body which would prevent the



use of the beak and of the wings, if these should be necessary. But if the head were turned downwards, or the body [illegible]en much out of the upright position, the principle of stability would be changed into a cause of falling. Hence, though these birds can run upwards, they come down backwards only, and that rather slowly and awkwardly; and they can get round only in an ascending spiral, hence they beat and hunt the trees from the roots upwards.*

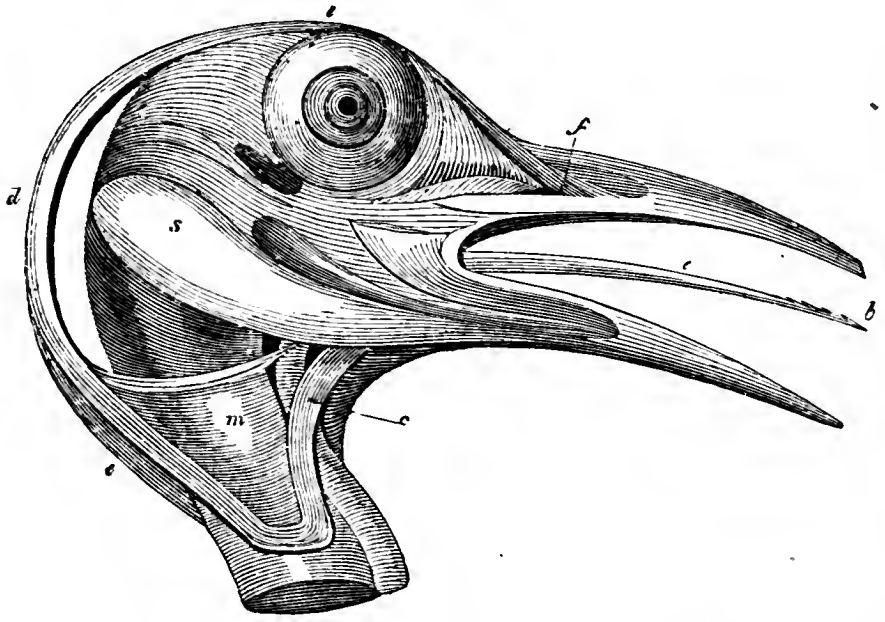
The bill being required for the performance of a peculiar and laborious operation, that of punching or picking into the bark or alburnum of trees, is accordingly adapted in the most beautiful manner for such a purpose. It is, in the typical species, perfectly wedge-shaped; both mandibles are of such an equal size and thickness, that, when closed, the commissure (or line made by the joining of the two together) is perfectly in the middle; the bill gradually becomes smaller from the base, and its circumference would be cylindrical were it not for certain ridges, which form little projecting angles, so that its section appears nearly hexagonal; the end has not a sharp point, but a perpendicular edge, like that of a wedge or hatchet.† This particular structure is not observed in the Green



* Feathered Tribes of the British Islands. † Swainson.

Woodpecker (*Chrysopterus viridis*) of this country, but it is seen in the greater and lesser spotted species.

The tongue has also a peculiar formation; it is vermiform, or worm-like, barbed at its point like the head of an Indian spear, and is capable, by means of the curious construction of its muscles, of being thrown out to a great length. In order to convey some notion of the manner in which this is effected, we have copied the figure given in Dr. Roget's Bridgewater Treatise, with the accompanying description and explanation.



The figure represents the head of the Woodpecker with the skin removed, and the parts dissected. The tongue, *a*, is supported on a slender *os hyoides*, or lingual bone, to the posterior end of which the extremities of two very long and narrow cartilaginous processes are articulated. The one on the right side is shown in the figure nearly in the whole extent of its course at *b*, *c*, *d*, *e*, and a small part of the left cartilage is seen at *f*. The two cartilages form, at their

junction with the tongue, a very acute angle, slightly diverging as they proceed backwards, until bending downwards at *b*, they pass obliquely round the sides of the neck, connected by a membrane, *g*; then, being again inflected upwards, they converge towards the back of the head, where they meet, and, being enclosed in a common sheath, are conducted together along a groove, which extends forwards, along the middle line of the cranium, *d*, till it arrives between the eyes. From this point the groove and the two cartilages it contains, which are now more closely conjoined, are deflected towards the right side, and terminate at the edge of the aperture of the right nostril, *e*, into which the united cartilages are finally inserted. In order that their course may be seen more distinctly, these cartilages are represented in the figure at *c*, drawn out of the groove provided to receive and protect them.* These cartilages are put in action by a long and slender muscle attached to the inner margin of each, and a counteraction is caused by another set of fibres passing in front of the anterior portion of the cartilages. The cartilages themselves are nearly as elastic as steel springs, and thus a considerable expense of muscular power is saved, and the bird is enabled to protrude and withdraw its lengthened tongue with great rapidity and but little effort.

In the cut, *h* is the salivary gland which secretes a glutinous fluid, with which the tongue is overspread, and by means of which, it is said, ants and similar small insects adhering to it are drawn into the bill; but whether this be so or not, there is another

* Animal and Vegetable Physiology, Dr. Roget.

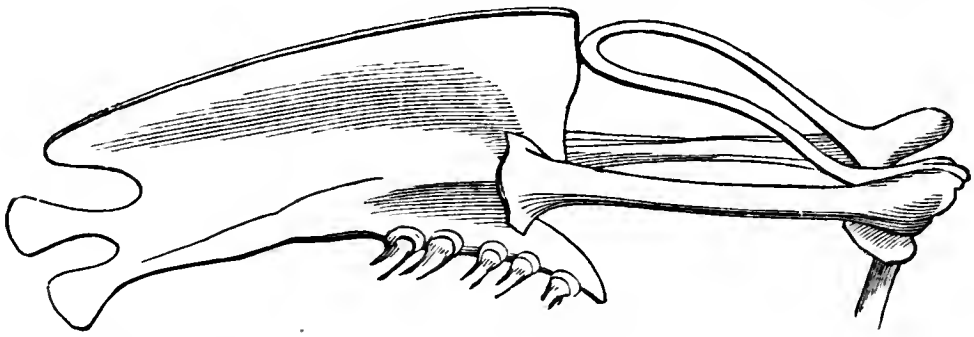
method by which the Woodpecker takes its prey. The tongue is terminated by a horny, thorn-like point, which, when the tongue is protruded, transfixes the insect, and the cartilaginous barbs with which it is armed prevent the insect from disengaging itself, let it struggle never so violently. The tongue is immediately withdrawn into the bill, and the insect is removed by means of a fringe of hairs pointed backwards and placed in the back of the palate, and surrounding a longitudinal groove. It is supposed that in detaching the transfixed insect the horny end of the tongue is pointed to the back of the throat, and then being brought forward into its usual position, the fringe detaches the prey from the barbs.*

The muscles which move the bill and head are capable of very powerful action, and by their means the bird is enabled speedily to punch a hole in the wood even of a living tree. The rapidity with which a Woodpecker pecks away at its work is almost incredible, the strokes cannot be counted, nor is it easy to detect the motion of the head and neck.

The main office for which the structure of a Woodpecker has to be adapted, says Mr. Mudie, is that of maintaining with the under part of the body a vertical position on the bark of a tree, in such a manner as to have the head, the neck, and the spine, as far as the lumbar vertebræ (which have a little more motion in this bird than in some others), perfectly free, so that the point of the bill may command the largest possible surface which is compatible with the length of the neck, or move with that force and velocity which are

* Bewick.

necessary for hewing holes in the wood with the greatest certainty and expedition. For this purpose the long sternum and coracoids, with the keel and furcal bone on the exterior side of them, form a flat arc with its chord; the former applied to the tree, so that the fixed point upon which the head and neck move in pecking may be brought nearer to the surface,



or moved farther from it, according as may be necessary. If this part (which may be called the base of the bird when in action) had been straight, there would have been more stability in one position, but it would have been only in one, and in that one only where the vertical line of the bark happened to be straight, which is not often the case in those gnarly and decaying trees which afford the fattest pastures for Woodpeckers. This, however, would have made the bird work at a disadvantage in excavating a hole to any considerable depth, because, if the position of the centre of action had been immovably adjusted to any one distance, the action of the bird would have been less effective at every other; but the arched form of the keel enables the bird to keep the centre of action always adjusted for the maximum effect, and that with so slight a motion of the steady or pectoral part of its body, that it can hardly be perceived.

A very little extension of the tarsal joints brings the centre of action more to the tree, and a very little bending of the same joints removes it farther away. Nor is this ready adaptation of the centre to the greatest effect of the stroke the only result of that action of the tarsal joints by which it is produced; for there is the same nice adjustment of the degree of hold taken on the bark to the varying stability of the position. When the centre of action is removed to the greatest distance, the centre of gravity is thrown furthest out, in proportion to the line of the axis, and therefore the weight tends more to pull the bird from the bark; but the very same action of the tarsal joints which produces this causes the claws to take a firmer hold of the bark, and also the stiff feathers of the tail to bear more against it as a support. So also, when the centre of action is brought nearer to the tree, and the hold by the foot not so much required, the same extension of the tarsal joint which brings the axis more parallel to the tree eases the clutch of the foot in exactly the same proportion.

Thus, by one of the most beautiful instances of the harmony of parts with each other, the Woodpecker is enabled to work with equal stability and effect, while the axis of the body is at all possible angles to the line of the tree, within the range that is necessary for its habit; and yet the different parts of this very curious and apparently complicated organization are so flexible to other purposes, that the Woodpecker can at once become a wing-bird or a ground-bird, when such a habit is necessary.*

* Natural History of Birds.

It is thus that the Woodpecker is fitted to perform his peculiar functions in the economy of nature; it is thus that he is enabled to seize those insects that lie beneath the bark of a tree, to quarry out those that are within the solid wood, and even to dig a mine there large enough for its own nidification.

The *Picidæ*, or Woodpeckers, with the exception of the Parrots, form the most extensive group among the *Scansores*. They are distributed over most parts of the world; America, however, produces the greatest number. Her vast and solitary forests affording at once a secluded retreat and ample food for their sustenance.

All the species are solitary, living in pairs only during the season of incubation, or are met with in small flocks, the amount of the year's brood, in the end of autumn, before they have separated. This solitary habit, and their haunts being generally gloomy and retired, has given rise to the opinion entertained by many, that the life of the Woodpecker is hard and laborious, dragged on in the same unvaried tract for one purpose—the supply of food. It has been painted in varied and imaginary colouring, and its existence has been described to be painful and burdensome in the extreme; its cries have been converted into complaints, and its search for food into exertions of no use. The cry of the Woodpecker is wild, and, no doubt, the incessant hewing of holes without an adequate object would be sufficiently miserable: these, however, are the pleasures of the bird. The knowledge to search after food is given it, and organs most admirably formed to prevent exhaustion and ensure

success have been granted to it. Its cries, though melancholy to us, are so from association with the dark forests and the stillness which surround their haunts, but perhaps at the time when we judge are expressive of the greatest enjoyment. An answer of kindness in reply to a mate, the calling together of the newly-fledged brood, or exultation over the discovery of some favourite food, are what are set down as painful and discontented.*

One of the most noble birds of the family is the Ivory-billed Woodpecker (*Picus principalis*). This majestic and formidable species, says Wilson, in strength and magnitude, stands at the head of the whole class (family) of Woodpeckers hitherto discovered. He may be called the king or chief of his tribe; and nature seems to have designed him a distinguished characteristic in the superb carmine crest and bill of polished ivory with which she has ornamented him. His eye is brilliant and daring, and his whole frame so admirably adapted for his mode of life and method of procuring subsistence, as to impress on the mind of the examiner the most reverential ideas of the Creator. His manners have also a dignity in them superior to the common herd of Woodpeckers. Trees, shrubberies, orchards, rails, fence-posts, and old prostrate logs are alike interesting to these, in their humble and indefatigable search for prey; but the royal hunter now before us scorns the humility of such situations, and seeks the most towering trees of the forest, seeming particularly attached to those prodigious cypress swamps, whose crowded giant trees stretch their bare

* Sir W. Jardine.

and blasted or moss-hung arms midway to the skies. In these almost inaccessible recesses, amid ruinous piles of impending timber, his trumpet-like note and loud strokes resound through the solitary savage wilds, of which he seems the sole lord and inhabitant. Wherever he frequents he leaves numerous monuments of his industry behind him. We there see enormous pine-trees with cartloads of bark lying around their roots, and chips of the trunk itself, in such quantities as to suggest the idea that half a dozen of axe-men had been at work there the whole morning. The body of the tree is also disfigured with such numerous and such large excavations, that one can hardly conceive it possible for the whole to be the work of the Woodpecker.

According to Audubon, the food of this species consists principally of beetles, larvæ, and large grubs. No sooner, however, are the grapes of our forests ripe than they are eaten by the Ivory-billed Woodpecker with great avidity. I have seen this bird hang by its claws to the vines in the position so often assumed by a titmouse, and reaching downwards help itself to a bunch of grapes with much apparent pleasure.

The strength of this Woodpecker, continues the same writer, is such, that I have seen it detach pieces of bark seven or eight inches in length at a single blow of its powerful bill, and, by beginning at the top branch of a dead tree, tear off the bark to an extent of twenty or thirty feet in the course of a few hours, leaping downwards with its body in an upward position, tossing its head to the right and left, or leaning it against the bark to ascertain the precise spot where the grubs were concealed, and immediately after

renewing its blows with fresh vigour, all the while sounding its loud notes, as if delighted.

Excepting when digging a hole for the reception of their eggs, these birds seldom, if ever, attack living trees for any other purpose than that of procuring food. They nestle earlier in the spring than any other species of the tribe. The hole is, I believe, always made in the trunk of a live tree, generally an ash or a hagberry, and is at a great height.

The male and female were frequently observed by Mr. Audubon to retire for rest for the night into the same hole, in which they had long before reared their young. Their mutual attachment is, he believes, continued throughout life.

This species is twenty inches long and thirty inches in extent.

The Red-head Woodpecker (*Picus erythrocephalus*) is also a native of America. It is active and lively, migratory in its habits, and beautiful in its general appearance. In winter it retires southward, though individuals are sometimes found throughout that season in Carolina, as also in the States of Pennsylvania and New York. In the forests and woodlands this species is abundant in summer, and it ventures near towns, without much apparent apprehension of man, though somewhat suspicious of his intentions when he approaches them, as Audubon relates. He says, that "when" they are "alighted on a fence-stake by the road or in a field, and one approaches them, they gradually move sideways out of sight, peeping now and then to discover your intention; and when you are quite close and opposite, lie still until you are

passed, when they hop to the top of the stake and rattle upon it with their bill, as if to congratulate themselves on the success of their cunning. Should you approach within arm's length, which may frequently be done, the Woodpecker flies to the first stake or the second from you, bends his head to peep, and rattles again, as if to provoke you to continue what seems to him excellent sport. He alights on the roof of the house, hops along it, beats the shingles, utters a cry, and dives into your garden to pick the finest strawberries he can discover." They commit as great depredations in gardens as any bird can do: fruit of every sort they devour with the greatest avidity; apples, cherries, pears, and strawberries, not to enumerate others, they seize and carry off to their retreats; they assemble in flocks to lay gardens under contribution, so that the bulk of their produce is soon cleared away. While the Indian corn is yet unripe and filled with its succulent juices, they commence their ravages upon it; and they are said to regale themselves upon the eggs of smaller birds. To the luxuries we have mentioned they add insects, which they hunt out of their hidden retreats in the crevices of ancient trees and underneath the perishing bark. When their hunger is appeased, they cluster together in small parties on the tops and branches of decayed trees, where, for dessert, they chase and capture the various insects which pass through the air, launching after them for eight or ten yards, at times performing the most singular manœuvres; and on securing their victim they return to the tree, where directly after a continuous cry of exultation is uttered. They

pursue each other on wing in a very amicable manner, in long beautifully curved sweeps, during which the remarkable variety of their plumage becomes conspicuous, and is highly pleasing to the eye. When passing from one tree to another, their flight resembles the motion of a great swing, and is performed by a slight opening of the wings, descending at first, and rising towards the spot on which they are going to alight, with ease and in the most graceful manner.

The Black Snake (*Colubra constrictor*) is said by Wilson to destroy many of the young of this species. It glides up the trunk of the tree, and, like a skulking savage, enters the Woodpecker's peaceable apartment, devours the eggs or helpless young, in spite of the cries or flutterings of the parents, and, if the place be large enough, coils himself up in the spot they occupied, where he will sometimes remain for several days.

The head and neck of this bird are bright crimson; back, wing-coverts, primaries, and tail-feathers black, with blue reflections; rump and secondaries white, the shafts of the latter black; breast and under parts white tinged with yellowish-brown; an irregular transverse band of black between the crimson of the neck and the white of the breast: length of the bird nine inches.

Of the species which are natives of America the Downy Woodpecker (*Dendrocopus pubescens*) is the smallest in size, and, from its habit of boring and digging into apple-trees, has been considered by Buffon and some other naturalists as the most destructive of its whole genus to the orchards. The American ornithologists, however, Wilson and Audubon, do

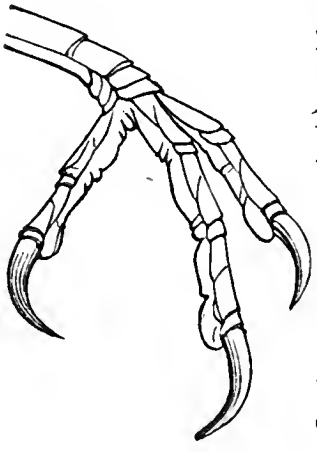
not accord with this condemnation of the little hammerer.

The principal characteristics of this species, according to Wilson, are diligence, familiarity, perseverance, and a strength and energy in the head and muscles of the neck which are truly astonishing. Mounted on the infested branch of an apple-tree, where insects have lodged their corroding and destructive brood in crevices between the bark and wood, he labours sometimes for half an hour incessantly at the same spot, before he has succeeded in dislodging and destroying them. At those times you may walk up pretty close to the tree, and even stand immediately below it, within five or six feet of the bird, without in the least embarrassing him. The strokes of his bill are distinctly heard several hundred yards off; and I have known him to be at work for two hours together on the same tree. He has a single note, or *chick*, which he frequently repeats; and when he flies off or alights on another tree, he utters a rather shrilly cry, composed of nearly the same kind of note quickly reiterated. In fall and winter he associates with the titmouse, creeper, etc.; both in their wood and orchard excursions, and usually leads the van. Of all our Woodpeckers, continues Wilson, none rid the apple-trees of so many vermin as this, digging off the moss which the negligence of the proprietor had suffered to accumulate, and probing every crevice. In fact, the orchard is his favourite resort in all seasons; and his industry is unequalled, and almost incessant, which is more than can be said of any other species we have. In fall, he is particularly fond of boring the apple-trees

for insects, digging a circular hole through the bark, just sufficient to admit his bill, after that a second, third, etc., in pretty regular horizontal circles round the body of the tree; these parallel circles of holes are often not more than an inch and a half apart, and sometimes so close together, that I have covered eight or ten of them at once with a dollar. From nearly the surface of the ground up to the first fork, and sometimes far beyond it, the whole bark of many apple-trees is perforated in this manner, so as to appear as if made by successive discharges of buck-shot. This is in a great measure the work of the little Downy Woodpecker.

In length this species is six inches and three quarters, and its extent twelve inches. It has been generally supposed that this bird, and some others of its family, feed upon the sap of the trees that it punctures, and they have therefore obtained the appellation of "Sap-suckers;" but this opinion appears to be erroneous.

The three-toed species exhibit an exception to the general zygodactylic form of the Woodpecker's foot. This peculiar form may probably enable the bird to run along the stem and branches of trees with greater facility than those which have two toes behind. They are inhabitants of America, Asia, and Europe. It is the hallux, or true hind toe, that is wanting.



1. The Wryneck.
2. The Nuthatch.

Wrynecks.

Other nearly allied genera are associated with the Woodpeckers, and, from the variation in the structure of the bill, support the necessary connection with the other families of the tribe. Such is the genus *Pogonias*, which, from the deep curved form of the bill, seems to lead back to the *Psittacidæ;* and nearly allied to it follows that of *Bucco*, or the Barbets, where the bill makes a nearer approach to that of the Woodpeckers. The Wrynecks (genus *Yunx*) are also properly included in this family, as well as that group of which the genus *Oxyrynchos* is the type.*

The common Wryneck (*Yunx torquilla*), which appears in this country from the south, in the spring, a little before the cuckoo, although not possessed of the climbing powers of the Woodpeckers, is yet enabled to support itself against the trunk of a tree, its toes being like theirs arranged in pairs; but the tail, unlike that of the Woodpecker, is soft and flexible. It feeds upon small insects, chiefly ants, which it collects from the bark of trees or from the ground; and it is therefore provided with a long extensile tongue, armed at the tip with a sharp cartilaginous point, but without any barbs. The chief food of the Wryneck, Mr. Selby observes, consists of ants and their larvæ; and we accordingly find that at the period of its arrival the

* Selby.

hybernation of these remarkable insects has yielded to the influence of the vernal sun, and the societies are busily employed near the surface of their little mounds in the various duties so admirably described by Huber and the authors of the "Introduction to Entomology." Its departure is also regulated by the same laws, as it leaves us when these insects, upon the approach of autumn or cold weather, again retire to the recesses of their subterranean habitations.

The mode by which the Wryneck picks up its food has not, it appears, been exactly ascertained. White of Selborne says the Wrynecks thrust their bills into the turf in quest of ants, which are their food. While they hold their bills in the grass, they draw out their prey with their tongues, which are so long as to be coiled round their heads. Colonel Montagu says that the ants are not transfixed by the horny point, as some have imagined, but retained by a peculiar tenacious moisture, by nature provided for that purpose; while it is feeding the body is motionless, the head only is turned to every side, and the motion of the tongue is so rapid, that an ant's egg, which is of a light colour, and more conspicuous than the tongue, has somewhat the appearance of moving towards the mouth by attraction, as a needle flies to a magnet. The bill is rarely used except to remove the mould, in order to get more readily at these insects; where the earth is hollow, the tongue is thrust into all the cavities to rouse the ants; for this purpose the horny appendage is extremely serviceable, as a guide to the tongue. Mr. Rennie having procured a young bird of this species, placed it in a cage in which was the empty nest of a

whitethroat. Some ants with their pupæ were thrown into the cage, and it was observed that the bird uniformly thrust its tongue between the grass stems of the whitethroat's nest, to rout out the ants which had taken shelter there, and as soon as they were thus forced within its reach, it picked them up in the usual way with its beak.*

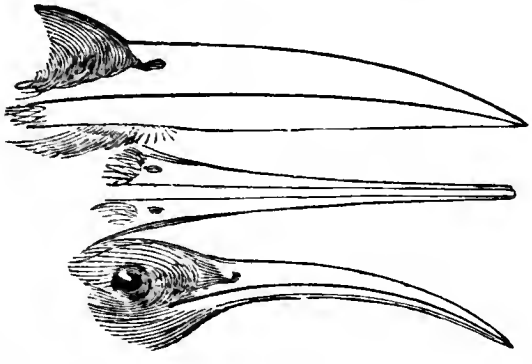
The Wryneck frequents warm and dry soils. Shy and unusually timid, Mr. Knapp observes, as if all its life were spent in the deepest retirement away from man, it remains through the day in some ditch bank, or basks with seeming enjoyment, in any sunny hour, on the ant-hills nearest to its retreat; and these it depopulates for food by means of its long glutinous tongue, which with the insects collects much of the soil of the heaps, as we find a much larger portion of it in its stomach than is usually met with in that of other birds.

The Wryneck breeds in the holes of decayed trees, but is unable to excavate a hole itself, although it may be capable of enlarging or otherwise adapting one to its purpose. The eggs are numerous, being nine or ten, and are deposited upon the bare rotten wood. Their colour is pure white.

* Faculties of Birds.

Creepers.

The last group of the *Scansores* consists of those birds which are familiarly called Creepers (*Certhiadæ*), from their habit of creeping about the boles and branches of trees, old walls, or other ruinous buildings. The members of this family are all climbers, but are separated from the preceding groups by the form of the feet, which instead of having the toes divided into pairs, have them disposed in the usual manner, that is, with three toes before and one behind; their length and structure, however (particularly that of the hind toe), is such as to render them equally efficient instruments for scaling perpendicular surfaces. In some species of the genus *Dendrocolaptes*, the bill is nearly the form of that of the Woodpeckers; and in

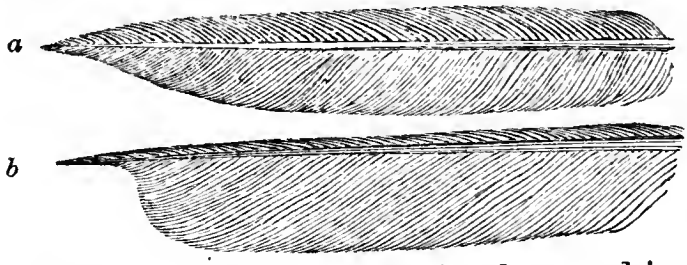


others it is very considerably modified, in accordance with the peculiar habit of the species. The general form of the bill is, however, long and slender, and usually more or less curved downwards.

For the structure of foot best adapted for running up the perpendicular surface of a wall or trunk of a tree we must look to the typical groups of the present family, and we shall find that the principal charac-

teristic features consist in the elongation of the hinder toe and claw, and the general curvature and sharpness of all the claws, so that they may hitch into the slightest inequalities of surface. It is only in the Australian genus *Climacteris*, Mr. Swainson observes, that this excessive development of the posterior toe is at its maximum; in this genus, owing to its enormous claw, the hinder far exceeds the length of the middle toe, and this latter is connected to the one that is external, nearly to the end of its first joint. It must, however, be observed that those birds which exhibit this great development of the hinder toe and claw derive their faculty of climbing from these members only; they receive no assistance whatever from their tail, which is not only destitute of naked points, which characterise the true Creeper, but are likewise destitute of all rigidity, so that, as a means of support, it becomes quite useless. When the tail acts as a support to the bird in its perpendicular ascent, the hind toe is proportionately diminished in length. It is in the subfamily *Certhianæ* that the highest development of the powers requisite for a scansorial Creeper are displayed. The toes of the common Creeper of this country (*Certhia familiaris*) for example, are very slender, the inner one considerably the shortest, and the hinder one again so lengthened that it equals the middle one; all the claws are large, very slender, and acute, but while those in front are greatly curved, that behind is much less so. The tail in this species exhibits a true scansorial structure, the feathers gradually tapering to a point (*a*), which are thus enabled to enter into the crevices and inequalities of the

bark, so as to obtain a rest whereon to support the weight of the bird, or, at all events, to assist in doing so. A still greater development of this power is observed in the tail-feathers of the genus *Oxyurus* (*b*), where the broad inner web terminates abruptly, leaving the point of the shaft naked. Other varieties of form in the tail-feathers of different species of this group of birds will be detected by the careful observer, each being adapted to the peculiar surface to which it is to be applied. Besides the little Tree-Creeper mentioned above, the Nuthatch and the Wren are included by Mr. Swainson in this family, amongst numerous other exotic species.



In some of their characters and habits, the Nuthatches (*Sittinæ*) bear considerable resemblance to the Woodpeckers, from which they differ in being able to ascend or descend the trunks of trees with equal readiness. The strength of their feet, the toes being remarkably large for the size of the bird, enables them to cling to small twigs in a manner similar to the Titmice.

The European Nuthatch (*Sitta Europæa*) is a well-known native bird, and will serve as an example of this sub-family. It is the only species found in Europe, or any of the immediately adjacent parts of the world. Some few others are found in America and the eastern Asiatic islands; but the species are not numerous.

As a British bird, the Nuthatch is confined to the south of England, and does not seem to have been found so far west as Cornwall. It resorts chiefly to

wooded and enclosed situations, and is in constant activity, searching for insects. It will creep round a branch with great facility, picking off the moss occasionally, or hammering against the bark. The tail of the Nuthatch is not of that firm texture which gives to the Woodpecker such advantage in ascending the tree, but is flexible and short; neither does the bird appear to require any such assistance, the strength of its claws being sufficient to support the weight of the body, and the position which it assumes, when hammering with its bill, being usually with the head downwards. It feeds upon the insects and their larvæ that infest the bark of trees, and also upon nuts, and other hard seeds. Its method of arriving at the kernel of hazel-nuts or filberts is curious; having detached the nut from its husk, and afterwards fixed it firmly in a crevice of the bark of some tree, it places itself above it, with its head downwards, and in this position splits the nut by reiterated strokes of its bill. In the autumn, many of these broken nutshells may be seen in the open bark of old trees, in places where these birds abound, as they return repeatedly to the same spot for this purpose. It is not improbable that the nuts selected for this operation are those which contain a grub, and which have a perforation in the shell, and are therefore more readily fractured. The filbert grub must be a dainty morsel for an insectivorous bird.

The deserted habitation of a Woodpecker is occupied by the Nuthatch as a place of nidification; and in order to accommodate the size of the entrance to its own dimensions, the hole is contracted by a plaster of clay. According to M. Montbeillard, when it cannot

find a hole in a tree suitable to its purposes, it hews out an excavation with its bill, if it can meet with a spot that is wormeaten. The nest is composed generally of dead oak-leaves heaped together without much order.

The manners of the Carolina Nuthatch (*Sitta melanocephala*) are thus described by Wilson. The White-breasted Nuthatch is common almost everywhere in the woods of North America, and may be known at a distance by the notes *quank, quank,* frequently repeated, as he moves upward and downward in spiral circles around the body and larger branches of the trees, probing behind the thin scaly bark of the white oak, and shelling off considerable pieces of it in his search after spiders, ants, insects, and their larvæ. He rests and roosts with his head downwards, and appears to possess a degree of curiosity not common in many birds, frequently descending very silently within a few feet of the root of a tree where you happen to stand, stooping, head downwards, stretching out his neck in a horizontal position, as if to reconnoitre your appearance; and after several minutes' silent observation, wheeling round, he again mounts with fresh activity, piping his unisons as before. Strongly attached to his native forests, he seldom forsakes them; and amidst the rigours of the severest winter weather his note is still heard in the bleak leafless woods, and among the howling branches.

Of the true Creepers we have an example in this country in the common Creeper (*Certhia familiaris*), the only species of its genus found in Europe. It is distinguished by a moderately long, slender, compressed, curved, sharp-pointed bill; narrow and tapering tongue, which is stiff and rather horny at the tip. Wings round

and hollow, as in the Woodpeckers ; the fourth and fifth feathers longest. Tail also, as in that genus, wedge-shaped, and composed of twelve rather stiff sharp-pointed feathers. The plumage on the upper parts is soft and very loose in its texture, the filaments of the feathers not adhering ; on the under surface white, silky and glistering. Legs short and slender ; the middle toe longest ; the inner much shorter than the outer ; hinder toe longer than the tarsus, the claw very long, and but slightly curved. All the claws very slender, the front ones very much curved and extremely sharp-pointed. It is common in Europe and North America.

This curious little bird is everywhere abundantly distributed over the British Islands, frequenting gardens, parks, and all places where trees are to be found. A retired inhabitant of the woods and groves, as a pleasing writer describes it, and not in any way conspicuous for voice and plumage, it passes days with us, scarcely attracting any notice or attention. Its small size and the manner in which it procures its food both tend to secrete it from sight. In these pursuits its actions are more like those of a mouse than of a bird, darting like a great moth from tree to tree, uttering a faint trilling sound as it fixes upon their boles, running round them in a spiral direction, when with repeated wriggles having gained the summit, it darts to the base of another and commences again.

The retiring and almost noiseless habits of this bird cause it to be but little noticed by those who are unacquainted with its faint call of *tsint, tsint.* It is by no means a scarce bird, and may be seen in almost every clump of tall trees, as it flits from one tree to another,

or creeps quietly along the outline of the trunk, with a rapid uniform motion, its tail bent inwards towards the tree, now and then peeping round to take a glimpse of the spectator. It will often flutter down after it has ascended a few feet, and again alight near the ground, ascending the same tree several times in different directions. It creeps with wonderful ease along or across the lower side of a horizontal bough, inserting its slender bill into the cracks and crevices of the bark, and there finding abundance of minute insects and larvæ, chiefly of the coleopterous order, which in such situations often lurk in perfect security from the attacks of most other insectivorous birds. Sometimes the little Creeper may be descried searching the topmost branches of a tall tree, anon examining the smaller twigs and sprays, and again the same indefatigable little creature may be seen creeping about upon a lichen-covered paling, pulling out minute spiders from their lurking-holes, and drawing forth the tiny inhabitants of every chink and cranny.

The Tree Creeper seems to hold on upon the vertical bole of a tree much in the manner of a cat, by means of its front claws, and can only descend a steep declivity in the same way as that animal does, backwards; the form of its claws preventing its taking a very firm hold with the head downwards; and, accordingly, though very commonly observed to ascend the same tree many times successively in different directions, it never creeps down again like the Nuthatch, but always flutters down again and again as soon as it has got to a certain height, and re-alights, as it did the first time, near the ground.*

* British Cyclopædia.

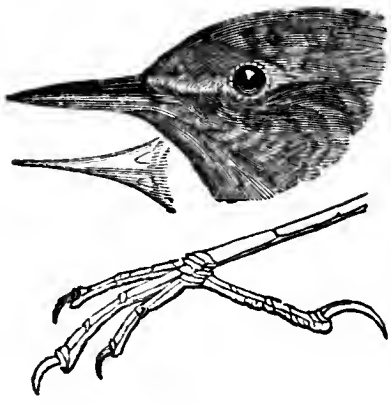
The Tree Creeper does not possess the muscular power in its feet which is observed in the Nuthatch, and its body is therefore supported by the sharply hooked front claws, and requires to be further propped up by its tail, the stiff pointed feathers of which, hitching upon every inequality, furnish, in conjunction with the toes, a very efficient support for so light a creature, but a support which can only be available in an ascending direction. This species is indeed so very light, that being held up in great measure by the tail, as it creeps up the perpendicular bole of a tree, there is hardly sufficient pressure upon the foot to cause much contraction of the toes, and it is only when on the under surface of a horizontal bough, with its nadir uppermost, that the whole weight of the bird hangs by the feet; and the tendons of its legs are so admirably constructed, that the greater pull there is thus upon them the more closely do the toes contract, and the firmer therefore is their hold, so the bird is thus able to creep with its back downwards, with little or no muscular exertion.*

The Creeper is incapable of excavating a hole for the purpose of nidification, but usually occupies one in some decayed tree, often within two or three feet of the ground, making a nest of grass and the dry inner bark, loosely put together, and lined with feathers. The eggs vary in number from seven to nine, and are white, speckled with reddish-brown. The male bird is said to have a song during the spring months, and even in fine weather during the winter, which it utters on alighting on a tree, and sometimes whilst creeping up a branch. The song is stated to be a faint trill,

* British Cyclopædia.

somewhat like the song of a chaffinch, but shriller, more resembling the rich note of the hedge-chanter.

We will not particularize the different species of which this family is composed, but pass on to the aberrant group in Mr. Swainson's arrangement, viz., the *Troglodytinæ*, or Wrens. These birds have such a slight development of the scansorial powers that they have been generally placed with the Warblers. So little indeed do the majority of them climb, in the true sense of the word, Mr. Swainson remarks, that it is only by tracing their close and unquestionable relation to others, in which the scansorial structure, and the faculty of exercising it, is more apparent, that we arrive at the positive certainty of their belonging to this family. The length and form of the bill and the brown plumage of our common species accord with the rest of the family; but it is the peculiar length of the hind claw which claims for this genus a station in the same family with *Platyurus* and other American species, which have additional scansorial characters.



There is a species, *Tichodroma muraria*, or Wall Creeper, which is seldom seen upon trees; the faces of vertical rocks and the walls of old edifices are its favourite haunts, where it feeds upon insects, their larvæ and pupæ, particularly spiders and their eggs, which it obtains from the clefts and crevices. It is a pretty little bird, of a light ash colour, the coverts and edges of a part of the wing-quills being bright

red. The throat of the male is black. It does not creep up the walls like its congeners, but flits from point to point, taking a firm hold in an upright position, and searching around for its food with a scrutinising eye. The tail-feathers, not being used like those of a true Creeper as a support to the body, are not worn at their points or edges. The nest is made in clefts of inaccessible rocks and crevices of lofty ruins. It is a native of southern Europe.

Here we close the scansorial tribe of birds.

Honey-eaters and Nectar Birds.

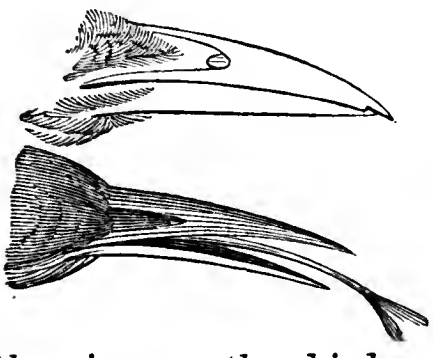
TENUIROSTRES.

THE tribe to which we now direct our attention will not yield to any of the others in interest or beauty. It contains some birds of the most splendid plumage, as well as the most diminutive in the whole class. The great majority subsist upon insects, which it is believed they suck up, by means of a filamentous tongue, from the nectar of flowers, and on this account they are sometimes called suctorial birds, or Honey-suckers. In the slender proportion of the bill, the shortness of the feet, and the extensile property of the tongue, they bear some resemblance to the scansorial Creepers. The tongue is long, always retractile, and instead of being pointed, like that of the scansorial insect-feeding bird, is either simply forked

or divided into several slender filaments, somewhat similar to a painter's brush. The bill in some species is so soft and flexible that it is incapable of grasping food, and appears in the typical groups principally intended to protect the tongue, as the chief member by which life is sustained. In the more typical species, as the feet are not required for progression upon the ground, or among the twigs or sprays of trees or shrubs, but merely for clinging to these latter, or supporting the bird upon its perch when inclined to rest, they are remarkably short and weak.

The tribe has been divided by Mr. Vigors into the following families, viz., *Meliphagidæ*, which are peculiar to the Old World; *Nectarinidæ*, found only in the New World; *Trochilidæ*; *Cinnyridæ*; and *Promeropidæ*: each of which will be noticed in its order.

The group which appears to be most aberrant of the tenuirostral birds on the side of the *Scansores* is that which comprises the Honey-suckers (*Meliphagidæ*). The food of these birds, as the name indicates, consists, it is supposed, in a great measure of the nectar or honey which is produced within the cups of flowers; and to enable them to procure this the bill is somewhat lengthened, and the tongue is generally terminated by a bunch of delicate filaments. The bill, however, exhibits a considerable diversity of size and strength, but it is generally stronger than in any other birds of this tribe, and has the upper mandible distinctly notched. The feet are large and



strong, and the hinder toe much developed. The typical genera, observes Mr. Swainson, are small on middle-sized birds; but some of those which are aberrant grow much larger. In the genus *Philedon*, the head is nearly bare of feathers, and the neck is surrounded with a ruff, somewhat similar to that of the Vultures; their size is nearly equal to that of a Jay; the claws are strong and acute.

The distinguishing peculiarity of these birds consists in the filamentous or suctorial development of the tongue, a form almost peculiar to the Honey-suckers of Australia and its islands. The tongue itself is not nearly so extensible as in the *Trochilidæ*, nor are the bones of the *os hyoides* carried back upon the skull, as in the Woodpeckers and Humming-birds. Lewin, who has figured and described many of these birds in his work on the "Birds of New Holland," and had an opportunity of observing their habits in that country, says that they are sometimes to be seen in great numbers constantly flying from tree to tree (particularly the blue gum, a species of *Eucalyptus*), feeding among the blossoms, by extracting the honey with their long tongues from every flower which they pass. He likewise observed that some of the birds of this group also feed upon insects, which they procure in a somewhat similar manner to the Woodpecker, by picking transverse holes in the bark, between which and the wood they insert their long tongue, drawing out the insects with great dexterity.

With respect to the feet of the *Meliphagidæ*, Mr. Swainson remarks that they are generally termed scansorial, although they possess only one of the

characters belonging to this type, namely, a very strong and lengthened hind toe and claw, formed, however, as in ordinary perchers. In every other respect the feet would indicate (from the length of the tarsus) that these birds occasionally frequent the ground, although (from the inequality of the lateral toes) their chief residence was among trees; this latter supposition is confirmed by their habits. Their food, as already intimated, consists of the nectar of the flowering trees of New Holland, which they lick with their brush-like tongue, together with such insects as frequent the same blossoms.

The wings of the Honey-suckers are rounded, and generally of moderate size. The plumage in general is dull, or at least destitute of those brilliant tints which are so strikingly developed in the generality of birds of this order.

Peculiar to the warmer continent of the New World, as the Sun-birds are to the tropical districts of the Old, the *Nectarinidæ*, or Nectar-birds, are distinguished by the bill being in general shorter than the head, wide at the base, but compressed from the nostrils. Top of the upper mandible with a distinct notch. Wings long; the three first quills nearly equal. The species of this family are but few, and their habits but imperfectly known. They do not climb, nor poise themselves upon the wing when searching for food, but hop from flower to flower, exploring the nectary of each.

No. 1. Recurved Beak Humming Bird.
2. Topaz Humming Bird.

Humming Birds.

TROCHILIDÆ.

THE known species of the numerous family of the brilliant little birds called Humming Birds amount to several hundreds, and, as their native localities are not easily explored, the unknown species are probably equal in number. They are the smallest of the feathered tribes. They are also the most beautiful, as to the texture and colour of their plumage; the most active and graceful; and, taken altogether, the most interesting and curious of the fowls of the air. They are principally, if not exclusively, natives of the American continent, here they actually swarm in the warmer and more fertile districts. They are not however, entirely confined to the tropical portion of the country, but are found in high northern latitudes, where the climate is not only temperate but cold; and when Captain King was surveying the coast of the extreme south of America, he found large flocks of Humming Birds flying about in the middle of a snow-storm, apparently unaffected by it.

Humming Birds (*Trochilidæ*) are ever on the wing in search of those minute insects which seek concealment as well as food within the flowers which bloom so luxuriantly in the warmer regions of America. "The central forests of that country," remarks an

elegant writer, "are festooned with an endless variety of climbing plants, usually having the flowers more or less bell or trumpet shaped, many of them of large dimensions, and of the most splendid colours. Among these the flowers of the natural order Bignoniaceæ appear to claim the special care of the Humming Birds. Within the nectared calyx of their splendid petals a numerous tribe of insect mites love to seek seclusion, and sip the luscious food; for the land of Humming Birds is, in an especial manner, also the land of insects."

The name of Humming Bird was given to the individuals of this family on account of the humming sound caused by the rapid motion of their narrow wings when suspended in the air, hovering about a flower in the manner of some species of dipterous insects in this country. The velocity of the movement is so great that the wings themselves are not visible; and the bird appears as if hung motionless upon the sound itself, while the radiant lustre of its metallic reflections constantly varies according to the direction of the rays of light. The muscular strength of these little creatures is so great, that they continue on the wing for a considerable time without inconvenience, indeed, they seem rather to gain an impetus for flight by the rapid action of their wings, as they instantaneously dart from one place to another, upwards, downwards, or laterally, without any perceptible effort.

The Indian name given to these little gems of the feathered race is equivalent to "beams or locks of the sun," in our own tongue. Their colours are so rich and brilliant, that they have been said to resemble the

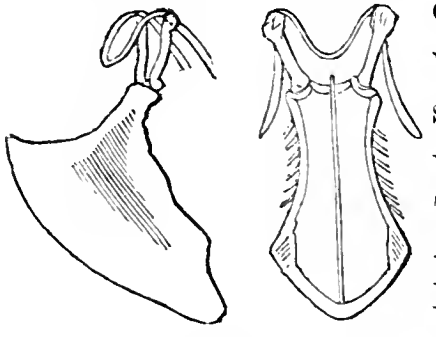
lustres of the topaz, of emeralds, and of rubies; and, in a poetical strain, it has been observed that "the hue of roses steeped in liquid fire will scarce depict their changing brilliance." They are as swift on the wing as the barbed javelin; fierce as tigers when opposed, and always ready to do battle with any intruder on their domains, and combat to the death. Displaying the courage and intrepidity of a knight-errant, with breast-plate, plume, and coat of mail, the little brilliant levels his pointed bill, and rushes on his antagonist. Stimulated to the highest degree by the excitement, the two combatants rise into the air, chirping, darting, and circling round each other, until the eye is no longer able to follow them; at length, one of them falls to the ground, exhausted, wounded, or dead.

In this country we can only be acquainted with a portion of their attractions. We are amazed at the brilliancy and variety of their colours, and astonished at the small dimensions of some of the species; but to see them in their native retreats, amidst the beautiful flowers which festoon the ever-verdant forests of tropical America, darting about in all directions, like meteors of the most enchanting colours, is a gratification which few Europeans are able to enjoy. The Indians are not insensible to their beauty, for females wear them as ear-drops, and as other adornments to their persons.

We now proceed to inquire into the modification of structure required by these active little labourers; but we may remark, in the first place, that they were supposed, until lately, to live altogether on vegetable food; that they subsisted solely upon the honey which

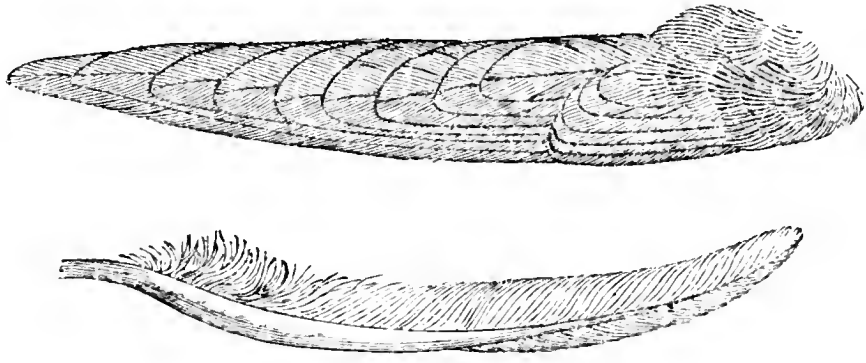
they obtained from the nectaries of flowers. It has been proved that they feed upon minute insects, and it has been doubted whether they partake at all of the nectar, it being assumed that their bills are not applicable to such a purpose. Many eminent naturalists still adhere to the opinion that, although they do at times feed upon insects, yet they likewise, and principally, subsist upon the vegetable juice secreted within the calyx of the flower. We must, however, take into consideration an axiom which few will hesitate to admit, namely, that all birds are created to perform some office calculated to produce beneficial results in the economy of the universe, and that the greater number of them, which do not serve as food for man, are employed in reducing the excess of animal or vegetable life; we may then perhaps be justified in concluding that Humming Birds do feed chiefly upon insects, that their labours are not altogether destitute of a beneficial end, and, therefore, not solely conducive to the gratification of their appetites.

The wonderful facility with which these little creatures perform their varied evolutions in the air, and the rapidity with which the strokes of the wings are made, require some extraordinary development of these



organs, and the machinery by which they are moved. The sternum is remarkably well developed, like that of the Swift. The keel is perhaps deeper, in proportion to the size of the whole bone, than in any other bird. It is in general without notches or holes at the

posterior angles, and is long in proportion to its width, and considerably broader in the rear than towards the front. The furcal bone is, proportionately, weaker than the other parts, and is not so perfect in the arch as that of the Swift. This is the sternal apparatus of a bird that feeds upon the wing, but has not the long-sustained *forward* flight of the Swift. It is merely required to support the bird and its muscular efforts, as it darts from flower to flower, or remains suspended on the wing in quest of food. The wings have a greater resemblance to those of the Swift, than of any other bird. They are remarkably long and narrow, reaching often beyond the limit of the tail feathers. The exterior outline of the wing is very much curved, and the first quill is always the longest, the other primaries gradually shortening. The secondary quills are generally very short, and the coverts are smooth and close set. The shafts of the quills are always very strong

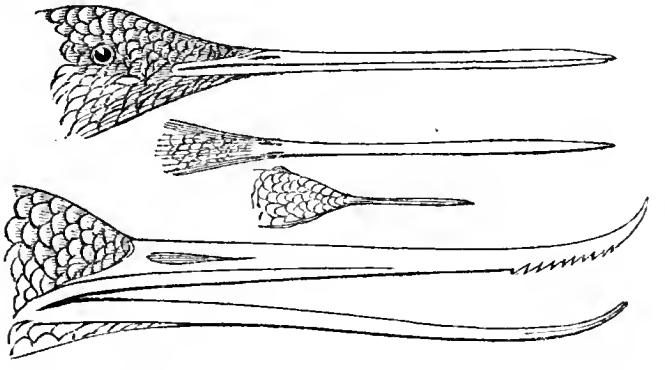


and elastic; and in some of the species the basal part of the shaft is so much enlarged, that its diameter nearly equals the breadth of the inner web. The webs are firmly united together and extremely compact, so as to form a substance almost like a thin plate of whalebone, and by reason of their strong resistance to

the air, and the rapidity with which they are worked, cause that humming sound from whence, as we have said, their name is derived.

The tail assumes a great variety of shapes, but the feathers are of the same firm character as those of the wings. It is pointed, rounded, squared, forked, very broad, ample, or scanty, in accordance no doubt with some peculiarity in the habits or economy of each species.

One of the most remarkable characters in these birds is observed in the bill. Its general form is long and slender, nearly of an equal thickness throughout, with the exception of the tip, which is usually very sharp and keen; but it varies considerably in length and curvature; and in some of the species its insectiverous character is developed more strongly by the presence of re-



curved saw-like teeth on the edges of the mandibles towards the point, as in *Trochilus recurvirostris*, and some others. In nearly all the species the upper mandible overlaps, or partially sheathes, the under one. Although in some of these characters the Humming Birds may partially resemble the Swift, how totally different is the form of the instrument by which their food is taken. Both birds seize their tiny prey while upon the wing; the latter gaping wide to snatch it, and passing onward in its rapid flight; the

former, while it hovers on the wing, inserts its attenuated bill, and with protruded tongue extracts its food from the honeyed cells of pendent tubular flowers. The one pursues, on ever-active wing, the ranging insect that, with bolder flight, appears to seek a rarer atmosphere in the loftier regions of the firmament; the other seeks the more hidden pest that delights to fatten, all unseen, on the nectar juice caverned within the calyx of the flower. The fitness of the structure of each bird to its peculiar functions and appointed occupation is wonderful and striking. The Humming Birds could no more exist in a climate where there was not a constant succession of flowers to harbour and nourish their prey, than the Swift could support its existence were no insects to people the air.

The tongue of the Humming Bird, like that of the Woodpecker and other scansorial, insectivorous birds, is retractile, and capable of being darted out with considerable force, by means of an apparatus similar to that of the Woodpecker. It is composed, according to Brisson and Lesson, of two muscular tubes, joined together through the greater part of their length, expanding towards the tips into a spoon-like form, and terminating in a sharp point. The food, which is procured on the tip of the tongue, is immediately conveyed to the opening of the œsophagus by the contractility of the tubes.

These birds do not alight upon the ground, nor have they any other use for their feet than to support themselves on a perch for the purpose of repose; the foot is therefore simply a perching foot, very small and slender; the claws being rather large

in proportion, very much hooked, and extremely sharp.

These curious little birds are not more remarkable for the great brilliancy of their plumage, than for the singular production of supplementary feathers, not absolutely requisite either for clothing or for flight, which grow from different parts of their bodies, but chiefly from some part or parts of the head or neck. These feathers, it is believed, are produced only on the males during the breeding season; but as the Humming Birds, in tropical countries at least, breed more frequently than almost any other birds, the season of love occupies a great portion of the year.

Perhaps the best and most ample accounts of the habits and economy of Humming Birds are those given by Wilson and Audubon, in their histories of the Northern or Ruby-throated Humming Bird (*Trochilus rubineus*); we shall therefore resort to their pages to obtain some information concerning the general habits of these "jewels of ornithology," as there appears to be great similarity in the manners of all of them. "No sooner," says Audubon, "has the returning sun again introduced the vernal season, and caused millions of plants to expand their leaves and blossoms to his genial beams, than the little Humming Bird is seen advancing on fairy wings, carefully visiting every opening flower-cup, and, like a curious florist, removing from each the injurious insects which would otherwise ere long cause their beauteous petals to droop and decay. Poised in the air, it is observed peeping cautiously and with spark-

ling eye into their innermost recesses; whilst the ethereal motions of its pinions, so rapid and so light, appear to fan and cool the flower without injuring its fragile texture, and produce a delightful murmuring sound, well adapted for lulling the insects to repose. Then is the moment for the Humming Bird to secure them. Its long delicate bill enters the cup of the flower, and the protruded double-tubed tongue, delicately sensible and imbued with a glutinous saliva, touches each insect in succession, and draws it from its lurking-place to be instantly swallowed.

"The prairies, the fields, the orchards and gardens, nay, the deepest shades of the forests, are all visited in their turn, and everywhere the little bird meets with pleasure and with food. Its gorgeous throat, in beauty and brilliancy, baffles all competition; now it glows with a fiery hue, and again it is changed to the deepest velvety black. The upper parts of its delicate body are of resplendent, changing green; and it throws itself through the air with a swiftness and vivacity hardly conceivable. It moves from one flower to another like a gleam of light—upwards, downwards, to the right, and to the left. In this manner it searches the extreme northern portions of our country, following with great precaution the advances of the season, and retreating with equal care at the approach of autumn."*

This little bird is seen in great numbers in the Canadas, and is said to abound most in the islands of the West Indian Archipelago. They have been obtained from the plains of the Saskatchewan, near

* Ornithological Biography.

the sources of the Elk River, and are known to reach as far as the fifty-seventh parallel.

"To enumerate all the flowers of which this species is fond," Wilson observes, "would be to repeat the names of half our American Flora. From the blossoms of the towering poplar or tulip-tree, through a thousand intermediate flowers, to those of the humble larkspur, he ranges at will and almost incessantly. Every period of the season produces a fresh multitude of new favourites. Towards the month of September there is a yellow flower, which grows in great luxuriance along the sides of creeks and rivers, and in low moist situations; it grows to the height of two or three feet, and the flower, which is about the size of a thimble, hangs, in the shape of a cap of liberty, about a luxuriant growth of green leaves. It is the *Balsamina noli-me-tangere* of botanists, and is the greatest favourite with the Humming Bird of all our other flowers. In some places, where these plants abound, you may see, at one time, ten or twelve Humming Birds darting about, and fighting with and pursuing each other. About the 20th of September they generally return to the south.

"The flight of the Humming Bird from flower to flower greatly resembles that of a bee; but it is so much more rapid, that the latter appears a mere loiterer to him. When arrived before a thicket of trumpet-flowers that are full blown, he poises or suspends himself on wing for the space of two or three seconds, and so steadily that his wings become invisible or only like a mist, and you can plainly distinguish the pupil of his eye looking round with great

quickness and circumspection. When he alights, which is frequently, he always prefers the small dead twigs of a tree or bush, where he dresses and arranges his plumage with great dexterity. His only note is a single chirp, not louder than that of a small cricket or grasshopper, generally uttered while passing from flower to flower, or when engaged in flight with his fellows, which is by no means an unfrequent occurrence."* He sometimes enters a room by the window, examines the bouquets of flowers, and passes out by the opposite door or window. He has been known to take refuge in a hothouse during the cool nights of autumn, to go regularly out in the morning, and to return as regularly in the evening, for several days together.

The nest of this species is about an inch in diameter, and as much in depth. It is generally placed on the upper side of a horizontal branch, not among the twigs, but on the body of the branch itself, and from ten to twenty feet above the ground. Sometimes it has been found attached by the side to an old, moss-grown trunk, or fastened to the stalk of a strong rank weed.

The outward coat is formed of small pieces of a species of bluish-grey lichen, that vegetates on old trees and fences, thickly glued with the saliva of the bird, giving firmness and consistency to the whole, as well as keeping out moisture. Within this are thick, matted layers of the fine wings of certain flying seeds, closely laid together; and, lastly, the downy substance from the great mullein and from the stalks of

* American Ornithology.

the common fern lines the whole. The base of the nest is continued round the stem of the branch, to which it closely adheres, and, when viewed from below, appears a mere mossy knot or accidental protuberance.

Lesson has described the nest of one species as principally composed of a spongy, cellular substance, apparently similar to that of a fungus, of which some species of wasps build large habitations, suspended from the branches of trees in the virgin forests of Guiana, and the same naturalist gives a figure of the nest of another species, composed entirely of the down of some thistle; the seed is attached, and is placed outwards, giving a jagged or prickly appearance to the outside, while the interior is warmly lined with the down. Two eggs only are laid by these birds. The period of incubation is remarkably short. Latham says that the black Humming Bird sits twelve days, and that the young leave the nest and follow their parents in eighteen days; and the North American species, according to Audubon, hatches only ten days, and the young are ready to fly in one week.

Those species which have the bill perfectly straight, and the tail ever so slightly divaricated, are considered the typical species. In the receding groups on either side, the bill is more or less curved, sometimes depressed at the base, and the tail is forked or rounded; in some species, the external feathers of the tail are considerably produced, in others, again, the two middle tail feathers are much longer than any of the rest.

The species which we have figured are the recurved

bill (*T. recurvirostris*), already named, and the Topaz. Of this last it has been said that, were all these brilliant birds to dispute the palm, and be observed in turn, it would be found the most beautiful. The light and elegant figure of this bird is something less than our Woodpecker. Its length from the tip of the bill to the end of the true tail is nearly six inches; the two long feathers exceed this by two inches and a half. The throat and breast are enriched by a plate of great brilliancy. Seen from the side, this colour changes into a golden green; seen from above, it appears a pure green. A coif of velvety black covers the head; a fillet of the same black encircles the topaz plate; the breast, the side of the neck, and the top of the back are of a most beautiful deep purple; the belly is still more rich, by a reflection of scarlet and gold; the shoulders, and the bottom of the back, are of a light red. The large feathers of the wing are of a violet-brown; the small feathers are ruddy. The colour of both the superior and inferior covertures of the tail is of a golden green; the lateral quill-feathers are red, and the two intermediate ones of a purple-brown.

The whole family has been divided into the following genera by Mr. Swainson, viz.—*Campylopterous:* having the bill curved; shafts of the quills dilated; tail graduated. *Lampornis:* with the bill straight, or very slightly bent; considerably depressed for its whole length, but more especially at the base; wings reaching to the end of the tail, which is short and even. *Trochilus:* having the bill very straight, long, cylindrical, or rather broader than high; tail generally

even, but sometimes slightly forked. *Cynanthus:* with a cylindrical bill, more or less curved; tail forked. *Phæthornis:* with the bill considerably compressed, generally curved from the base; tail graduated or cuneated.

Another very beautiful family of birds succeeds to the *Trochilidæ;* it is composed of the Sun-birds, *Cinnyridæ*, inhabitants of the tropical portions of Africa and India. They are small birds, but are clothed with most brilliant plumage. The bill is very long, slender, and acutely pointed; the margins in some of the species being dentated in the most regular manner; their serratures are so small as scarcely to be seen by the naked eye. The tongue is formed into a bifid tube, or rather, as Mr. Swainson suspects, into two flattened filaments; it is long and susceptible of protrusion. The feet are moderate in their dimensions, and the wings moderate in length and rounded.

The gay and beautiful tints which are so strikingly developed in the Sun-birds, have caused them to be much sought after as ornaments to the person or museum; a rich golden green, varied on the under parts with steel-blue, purple, bright orange, or vivid crimson, decorates nearly all the species, and produces a brilliancy of colours only rivalled by those of the Humming Birds. It is only, however, in the pairing season that the male birds assume this metallic lustre of plumage. They feed on minute insects and, it is supposed, on the nectar of flowers, which they procure by probing the honeyed calyx with their lengthened bills, whilst hovering on the wing.

The following description by Mr. Swainson of the splendid Sun-bird (*Cinnyris splendida*) will give some idea of the beautiful appearance of these birds. "The enthusiastic Le Vaillant," says that eminent naturalist, "might well be enraptured upon discovering this charming little creature, which is certainly the most splendid species in this group we have yet seen. Its head and neck may be called either purple, blue, violet, or lilac, for it changes to one or the other of these tints according to the direction it is held in, whether to or from the light, whether viewed by the sun or by a candle; in either case the plumage is as glossy as polished steel, while those parts not illuminated by the light become absolutely black. Such is the appearance of the crown, sides of the head, the neck, and the throat, to a little beyond the breast, where this colour is crossed by several narrow irregular lines of bright scarlet; the lower half of the body, to the vent, is deep uniform black, without any gloss; the upper plumage, from the interscapulars to the tail-coverts, is the most brilliant polished blue-green, one or other of which colours preponderate according to the light; but there is no golden or other tint intermixed. The same green is upon the lesser wing-coverts, and the under tail-coverts. What particularly distinguishes this species from all others yet known, is the great prolongation of the upper tail-coverts, which are quite as long as (and entirely conceal) the tail itself, the feathers of which are all even, and blue-black. The wings, feet, and bill are solely black. The length of this species is three and a half inches."

Another species, the olive-backed Sun-bird (*Cinnyris*

chloronotus), is thus coloured. The whole of the head, neck above, and the throat, as far as the breast, is of a dark glossy blue-green; this colour terminates before it reaches the interscapulars, which, with the remainder of the upper plumage, is olive-green, over which there is a strong tinge of yellow, without any of that metallic gloss seen on the head and neck. The side feathers on the breast, just beneath the wing, are of a clear and delicate straw-yellow; while the whole of the body, belly, vent, and under tail-coverts are of a deep and uniform cinereous grey. The quills and tail-feathers are dark hair-brown, edged with yellowish olive. Length five inches.

Hoopoes.

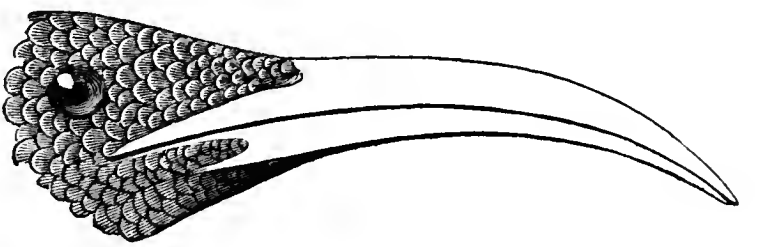
Next in succession to the Sun-birds, and forming the aberrant family of the tenuirostral birds, are arranged the Hoopoes (*Promeropidæ*), the species of which are few in number, and restricted to the Old World. These birds are distinguished by a syndactylic form of foot, the outer toe being united for half its length to the middle toe; and a very long, compressed, curved bill. The plumage of the Hoopoes is generally glossed with a metallic blue andd eep green; and in one species, the Grand Promerops of New Guinea, the side and tail-feathers are developed in the most singular and extraordinary manner, indicating in this respect a close affinity to some of the Paradise Birds. The Hoopoes are ground-feeders; but their legs are short, and their feet combine the properties of perching and walking feet. They feed upon insects, worms, and other similar prey that are found in moist marshy situations. The length of their bill facilitates the capture of their food in thick herbage, or even at some depth under water. One species, the Common Hoopoe, as it is termed, annually visits Europe during the summer months, and is occasionally found to reach as far as this island; and instances are recorded of its having bred in this country. The Hoopoe is a handsome bird, and marches on the ground with a kind of strut, bearing some resemblance to that of *Gallinidæ*. They not only perch with great firmness upon low

bushes and stumps, by the margins of the waters which form their usual resting-places when watching for their prey, but it is said that they can upon occasions cling to perpendicular surfaces; as, however, the foot is not adapted for adhering to a vertical surface for any length of time, they are in constant and active motion.

Moist localities are generally resorted to by the Hoopoe, in the neighbourhood of woods and thickets, and the banks of rivers, especially those which are occasionally flooded. There it may be seen upon the ground, busily searching for its favourite insects, chiefly coleopterous, and the spawn of fishes and reptiles. It may sometimes be seen, Mr. Selby observes, hanging from the branches of trees, in search of the insects that chiefly dwell on the under sides of the foliage. It builds in the holes of decayed trees, but when these situations cannot be obtained, will make use of the crevices of walls and rocks. The nest is formed of dry grass, lined with feathers or other soft materials; and it lays four or five eggs of a greyish-white, spotted with hair-brown.

The length of the Hoopoe is more than a foot, the extent of the wings more than a foot and a half, and the weight about three ounces. The most remarkable external characteristic of the bird is its crest, consisting of two rows of orange feathers, tipped with black, extending backwards along the head, capable of being elevated or depressed, and giving a sprightly air to the bird. The head, neck, and breast are brownish-red, the upper part of the back greyish-brown, and the hinder part barred with black and white; the under parts of the bird are white, with longitudinal

streaks of brown. The wings and tail are black, the former with five regular white bars on each, and the latter with a chevron of white, the angle directed to the body of the bird. Its flight through the air is by leaps, or undulatory, and, to appearance, performed with considerable labour; but from the long migrations which it makes, it must be capable of long continuance.* The engraving represents the bill of *Epimachus magnificus*, the Splendid Epimachus, which has the bill of *Upupa* and *Promerops*, with the scaly or velvet feathers covering the nostrils,



as in the Birds of Paradise. The plumage is extremely brilliant, and the flank feathers of the male are elongated and fringed. Sonnerat says that there does not perhaps exist a more extraordinary bird than the Grand Promerops of New Guinea. It is four feet in length, from the extremity of the bill to that of the tail. Its body is delicate, slender, and, although it is of an elongated form, appears short and excessively small in comparison with the tail. To add to the singularity of this bird, Nature has placed above and below its wings feathers of an extraordinary form, and such as one does not see in other birds; she seems, moreover, to have pleased herself in painting this being, already so singular, with her most brilliant

* Feathered Tribes of the British Islands.

colours. The head, the neck, and the belly are glittering green; the feathers which cover these parts have the lustre and softness of velvet to the eye and to the touch; the back is changeable violet; the wings are of the same colour, and appear, according to the lights in which they are held, blue, violet, or deep black, always, however, imitating velvet. The tail is composed of twelve feathers, the two middle are the longest, and the lateral ones gradually diminish; it is violet or changeable blue above, and black beneath. The feathers which compose it are as wide in proportion as they are long, and shine both above and below with the brilliancy of polished metal. Above the wings, the scapulars are very long and singularly formed; their barbs are very short on one side, and very long on the other. These feathers are of the colour of polished steel, changing into blue, terminated by a large spot of brilliant green, and forming a species of tuft or appendage at the origin of the wings. Below the wings spring long curved feathers, directed upwards; these are black on the inside, and brilliant green on the outside. The bill and feet are black.

Birds of Paradise.

CONIROSTRES.

With the *Promeropidæ* we closed that tribe of birds the members of which are exclusively organized for feeding upon the minute insects which infest the flowers of plants and trees, or for imbibing, by means of their filamentous tongue, the nectar of the flowers, and we now enter that which contains birds of the most opposite characters to those we have just been considering—birds whose individual faculties and organization are more varied or perfect than those of any other tribe; who feed indiscriminately upon insects, fruits, and vegetables; who perch upon slender sprays, and walk upon the ground with equal facility; and some of whom are the largest and the most extraordinary birds in appearance of the whole order. The bill exhibits a considerable firmness of structure, and is more or less conical in its form; the notch in the upper mandible is very slight, and the tip is rarely hooked; in some of the species it is beautifully adapted for the fracture of the hardest seed-stones, or for extracting the seeds from the most concealed recesses. The feet, in almost every instance, have three toes in front and one behind, and are of strength sufficient to become available instruments of progression upon the ground or amongst the branches of trees.

By Mr. Swainson, the five primary divisions of this tribe are considered to be the families *Corvidæ*, *Sturnidæ*, *Fringillidæ*, *Musophagidæ*, and *Buceridæ*,

though the first and second are considered by him and Mr. Vigors as the two typical groups, on account of their more perfect and varied faculties; if the conic form of the bill is the peculiar character upon which the order is founded, it follows that those birds which exhibit this character in the highest degree of development must be arranged as the typical group. It is stated by Mr. Swainson, that the bill of the *Fringillidæ* is most typical in this respect; we have therefore considered that family as the most typical group. According to their natural affinities, then, the other families will assume the above arrangement, which we will now endeavour to show.

That the Paradise Birds, which we include in the family *Corvidæ*, exhibit a strong affinity to some species of the *Promeropidæ* is generally acknowledged; indeed, Mr. Swainson considers them as belonging to the tenuirostral tribe, and immediately to succeed that family. The form of their bill and feet, however, together with their general organization, induced Baron Cuvier to arrange them with the Crows, and they have generally been considered by ornithologists as belonging to that family.

The general character of the *Corvidæ* are, the bill strong, more or less compressed or flattened on the sides, sharp and trenchant in the cutting edges, slightly curved towards the point; commissure straight; nostrils covered or defended by incumbent bristles or feathers. Feet strong, with three toes directed forwards and one backwards; the three front toes divided to their bases. Wings in general long and pointed; the second and third quills are, however, shorter than the fourth one,

so that the wings are not of that form which is best adapted for turning readily in the air, although they are capable of sustaining a protracted flight.

The Paradise Birds (*Paradiseanæ*) are those which exhibit the greatest affinity to the tenuirostral tribe, or suctorial birds. These are very peculiar birds, confined to a peculiar situation on the globe, whose climate, seasons, and the greater part of its natural productions are also peculiar, and not to be met with in any other part of the world.

The exceeding elegance and richness of the plumes of these birds not only procured for them names indicative of superior attractions, but gave them a notoriety which caused them to be sought after by the chiefs and nobles of all lands, and they have long been a source of profitable trade to those who have been fortunate enough to procure them. The extraordinary fiction with which the craft of the inhabitants of the Eastern countries where they are found deluded the ignorant, rendered them still more objects of curiosity and desire. The natives were in the habit of carefully removing the legs from the skins ere they produced them for sale, and they were stated to pass their whole existence in the air, where all the functions of life were carried on.

> "The golden birds, that ever sail the skies,
> Here to the sun display their shining dyes;
> Each want supplied on air they ever soar;
> The ground they touch not till they breathe no more." *

The dew and the vapours were said to be their only food. The brilliant lustre of their plumage, the rich

* Camoens.

hues and delicate structure of their ornamental trappings and thread-like feathers, fostered the idea that they were inhabitants of some ever calm and sunny region, where no storms occurred to ruffle their plumes, and where they floated about on never-tiring wing, in a balmy perfumed atmosphere and a cloudless sky. They were called Birds of Paradise, God's Birds, Passaros de Sol.

Although the peculiar habits and economy of the Birds of Paradise have not yet been examined or made familiar to the naturalist, they are supposed to feed chiefly upon soft substances, such as the pulpy or farinaceous parts of fruits, upon worms and insects. They are natives of New Guinea, the Papuan Islands, or islands of the Indian Ocean, whose inhabitants are exceedingly remote from civilization. The skins which are brought to this country are obtained chiefly from the Chinese traders, in a dry and mutilated state.

New Guinea appears to be the head-quarters of these birds, from whence they migrate seasonally to the smaller isles which lie in its vicinity. They resort to the forests, not, like the parrots, to clamber amidst the twigs and leaves in search of their food, for their flowing trains and ornamental plumes would ill accord with such a habit, but to perch on the summits of the loftiest trees, or to seek shade and shelter beneath their ample foliage. They live in troops, some of them at least have been observed to do so, and seek their food only at the rising and setting of the sun.

The islands on which these birds have hitherto been found are subject to alternations of rain and drought,

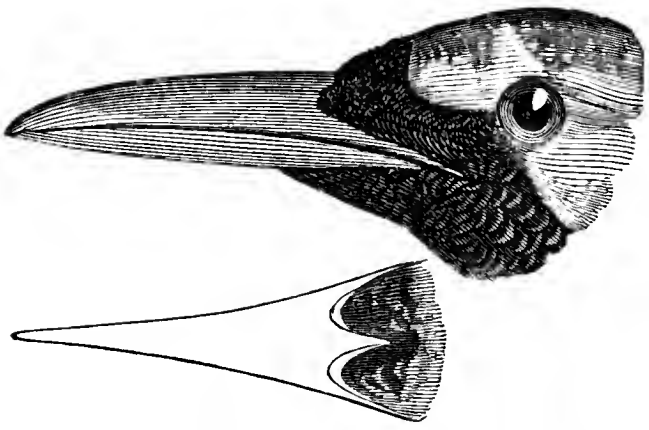
though not so violent nor of so long continuance as in the more extended lands within the tropics; and the fervent heat of the rainless period produces eventually a temporary suspension of animal and vegetable action, so that the birds are forced to seek a moister atmosphere, where their food may still be found. At these places, says an amusing and elegant writer, where the earth and the upper part of the forest are parched, and the ardour of the unclouded sun continues to beat, there is a constant rarefaction, and consequent ascent of the whole mass of the atmosphere; and in consequence of this the winds from the more humid surfaces must blow towards those parched places with velocities proportional to the differences between the one and the other. It is this which produces the seasonal winds of the tropical countries, and it is this, acted on by the changing declination of the sun, which produces the changing monsoons or alternations of the tropical seasons.

When the forest, which is the haunt of the Paradise Birds, at any particular time becomes parched, their food lessens, and they are compelled to be more on the wing in their search after it. But on which side soever there then happens to be a place more humid and more abounding in those creatures on which they feed, and which on this account is better suited to them for the time, there is a wind which blows from that side toward the place which is parched and heated, and the action of that wind upon their flocculent feathers turns them round on their centres of gravity like weathercocks; their heads are, as they fly, turned to the wind, and their progress is of course against its

current. Their feathers must thus in so far assist the birds in finding out the direction of those places where they can feed.*

During very rough weather the Birds of Paradise remain in their retreats, the flocculent nature of their plumage rendering them unable to contend with strong winds or heavy rains.

The generic characters of the Paradise Birds are, the bill of moderate size, straight in its general line,



but arched in the culmen, and slightly hooked at the tip of the upper mandible, in which there is either no notch or a mere rudiment of one; nostrils basal and lateral, open, but concealed among the feathers at the base of the bill. The tarsi and toes are stout; the former generally short; the latter three to the front and one behind; the middle toe shorter than the tarsus, the outer united to it at its base, and the inner joined to half the length of the first phalanx, the hinder toe larger and stronger than the others. The first five quills of the wings are nearly of equal length, and the sixth or seventh usually the longest.

There are several species of Paradise Birds, whose characters are tolerably known; but others have only been observed by the naturalist in a mutilated state;

* British Cyclopædia.

and their peculiar characters, save with regard to their plumage, are totally unknown. They have all produced feathers, with flocculent webs on the flanks, the scapulars, or both; they have, in general, long thread-like feathers in the tail, which are sometimes terminated by little discs or palettes, and the plumage of the rest of their bodies is in a great measure peculiar. All their feathers are better formed for taking hold on the wind than for making way against it, for they are all remarkable for their loose and velvet-like texture. This is remarkable in the feathers of the head, and in those of the neck, more especially in the species which have a ruff of produced feathers upon that part; but it is not confined to these, for the whole plumage of the body, and even the flying feathers of the wings, have a more loose and velvety texture than those of most other birds.

The species which is most known in this country is likewise the most elegant bird of the family. It is the *Paradisea apoda* of Linnæus, or the great Emerald Bird of Paradise. From the point of the bill to the extremity of the tail the length is about a foot; but the produced feathers of the flanks, which are exceedingly light and beautiful in their form, extend about a foot more. The general colour is a rich cinnamon-brown, but it varies considerably on the different parts. Over the nostrils and on the forehead there are very thick, soft and velvety, black feathers, with green reflections. The crown and nape are pale yellow, the throat golden green, the hind part of the neck purple-brown, the rest of the upper part, and also the breast and belly, maroon-brown; the bill yellowish-black. The

colours are subject to considerable variation in different specimens; as, for instance, the throat is every shade from golden green to a rich golden yellow, and when this part is more inclined to yellow, all the rest of the bird is of a paler tint; but whether these variations are the result of difference of age or season, or whether they are permanent for the life of the birds, has not been ascertained.

The produced feathers on the flanks and in the tails of these birds are among the most remarkable of their external characters. Those which originate in the flanks are of a pale yellow or straw colour for the greater part of their lengths, but they are marked with purplish-red towards their origin. It is difficult to imagine any structure more beautiful. The shafts are finely tapering, and the fibres of the webs, which are quite detached from each other, have secondary ramifications; and the whole are fined off towards the extremities, so that they really more resemble the tail of a comet than they do any more solid matter; but unsubstantial as they seem toward their extremities, the shaft and web are so well proportioned to each other that the whole feather floats far and gracefully, and with the very maximum of tenuity it has no appearance of weakness. Besides those, there are two very peculiar filaments of feather, covered with velvety down, interspersed with short stiff hairs, which have, however, nearly the same lustre as the down, which originate one on each side of the rump, and both extend to nearly the length of two feet. These are yellowish at their bases; but for the greater part of their length they are nearly black, and show a

very peculiar mixture of greenish lustre, which can hardly be called a reflection, for the hue of it is velvety rather than metallic, and it is a very intense and rich colour; though there is so small a portion of this green that it is only visible in certain positions of the light with regard to the feathers, yet when the eye can catch it, it is of the most intensely rich shade that can possibly be imagined.*

The habits of this species are but little known. M. Lesson says, the Birds of Paradise, or at least the Emerald (*P. apoda*), the only species concerning which we possess authentic intelligence, live in troops in the vast forests of the country of the Papuans, a group of islands situated under the equator, and which is composed of the islands Arou, Wagiou, and the great island called New Guinea. They are birds of passage, changing their quarters according to the monsoons. The females congregate in troops, assemble on the tops of the highest trees in the forest, and all cry together to call the males. These last are always alone, in the midst of some fifteen females, which compose their seraglio, after the manner of the gallinaceous birds.

M. Lesson says, that while he was on a shooting excursion the Manucode presented itself twice, and that they killed the male and female. This species seems to be monogamous, or perhaps it is only separated into pairs at the period of laying. In the woods this bird has no brilliancy; its fine-coloured plumage is not discovered, and the tints of the female are dull. It loves to take its station on the teak-

* British Cyclopædia.

trees, whose ample foliage shelters it, and whose small fruit forms its nourishment. Its irides are brown, and the feet are of a delicate azure. The Papuans call it Saya.

The same author writes thus:—Soon after our arrival in this land of promise (New Guinea) for the naturalist, I was on a shooting excursion. Scarcely had I walked some hundred paces in those ancient forests, the daughters of time, whose sombre depth was perhaps the most magnificent and stately sight that I have ever seen, when a Bird of Paradise struck my view; it flew gracefully and in undulations, the feathers of its sides formed an elegant and aerial plume, which, without exaggeration, bore no remote resemblance to a brilliant meteor. Surprised, astounded, enjoying an inexpressible gratification, I devoured this splendid bird with my eyes; but my emotion was so great that I forgot to shoot at it, and did not recollect that I had a gun in my hand till it was far away. One can scarcely have a just idea of the Paradise Birds from the skins which the Papuans sell to the Malays, and which come to us in Europe. These people formerly hunted the birds to decorate the turbans of their chiefs. They call them Mambéfore in their tongue, and kill them during the night by climbing the trees where they perch, and shooting them with arrows made for the purpose, and very short, which they make with the stem of the leaves of a palm (Latanier). The campongs or villages of Mappia and of Emberbakene, are celebrated for the quantity of birds which they prepare. Some, at the request of the Chinese merchants, are

dried with their feet on. The price of a Bird of Paradise among the Papuans of the coast is a piastre at least.

The cry of the Emerald is loud and piercing; that of the male resembles the words *voike, voike, voike, voiko,* strongly articulated, so much so as to be heard at a long distance. The female, deprived of the brilliant plumage that adorns the male, is clad in sombre attire, and the cry is much more feeble.

This species, being the most elegant and best adapted as an ornament for the head and other purposes, has been in request from the earliest times of which we have any knowledge of these eastern climes; and the natives contrive to procure them by means of blunted arrows, without wounding the skin or materially ruffling the plumage. The feet and wings are then removed, the body drawn, extended on a stick inserted by the bill, and then dried in smoke, to such a degree that it is not liable to be destroyed by insects.

Mr. Bennett, in his "Wanderings," says that this elegant creature has a light, playful, and graceful manner, with an arch look, dances about when a visitor approaches the cage, and seems delighted at being made an object of admiration; its notes are very peculiar, resembling the cawing of the raven, but its tones are by far more varied. During four months of the year, from May to August, it moults. It washes itself regularly twice daily (it was confined in an aviary), and after having performed its ablutions, throws its delicate feathers up nearly over the head, the quills of which feathers have a peculiar structure, so as to enable the bird to effect this object.

Its food, during confinement is boiled rice, mixed up with soft eggs, together with plantains, and living insects of the grasshopper tribe; these insects, when thrown to him, the bird contrives to catch in its beak with great celerity; it will eat insects in a living state, but will not touch them when dead.

The bird is not at all ravenous in its habits of feeding, but it eats rice leisurely, almost grain by grain. Should any of the insects thrown into his cage fall upon the floor, he will not descend to them, appearing to be fearful that in so doing he should soil his delicate plumage; he therefore seldom or never descends, except to perform his ablutions in the pan of water placed at the bottom of the cage expressly for his use.

N° 1. The Common Crow
2. The Nutcracker

Crows.

Of the family *Corvidæ* there are several divisions or sub-families; some of the genera of which, in the metallic lustre of their plumage, and the velvet-like process that in some species ornaments the face, indicate their close affinity to the Birds of Paradise. Of the sub-family *Corvinæ* many species are common in this country, such as the Raven, Crow, Magpie, etc. Generally speaking, these birds are all sober and even sombre in their attire, but there are a few exceptions; and even in the most dull-garbed ones there is a beautiful compactness in the plumage, which appears to be well tempered to the elements, so that they are enabled to be constantly beating about and ranging far and wide in search of food, returning generally to their habitual dwellings at night. They are more generally distributed over the globe than most birds, and they appear to possess no slight degree of intelligence and cunning. Some of the species, indeed, are notorious for their surprising capacity of observation. Wild or tame, they are always prying about, and not only perceive what is immediately beside them, but have no inconsiderable amount of knowledge of what is going on in the world around them; and though this vigilance renders them very wary of real danger, and very expert in avoiding it, it gives them a degree of self-possession much greater than that of most birds.

Some of the species have for a long time been accused

of committing considerable depredations upon the property of man; but although this may in a measure be correct, the good that they do far exceeds the amount of evil that is caused by their plunderings. Were it not for the labours of the birds of this genus, it is doubtful whether any country could be profitably cultivated. They are particularly organized for picking out from beneath the surface of the ground the hidden grubs or larvæ that do such mischief to the sprouting grain and seed, as well as the herbage of the meadows. Even the Raven, that bird of evil omen, as he has been considered, does his meed of good, and is seldom found where he is not wanted; and although he is apt at times to attack the young and helpless of the flock, it is generally believed, in those places where Ravens abound, that he scents nothing but disease. In healthy districts, where the flocks are in good condition, the Raven levies no contribution, and seldom makes his appearance at all.

The great perfection and variety of the powers exhibited by these birds has induced Mr. Swainson to consider them the typical form of the whole class of birds. This superiority consists, he says, not in the extraordinary development of any one particular organ or quality, but in the union of nearly all those powers which have been separately assigned to other families. This perfection is best exemplified in looking to the economy of the ordinary Crows. In every climate habitable by man these birds are found. They are as well constructed for powerful and continued flight, as for walking with a firm and stately pace on the earth; they feed indiscriminately on animals or

vegetables, and, when pressed by hunger, refuse not carrion—hence their smell is remarkably acute. They are bold but wary, live in common societies, and possess great courage. When domesticated, they evince a power of imitating the human voice nearly equal to that of the Parrot; while their cunning, pilfering, and hoarding dispositions are all symptoms of greater intelligence than what is found in most birds.*

The Raven (*Corvus Corax*) is common over the whole of Europe and a great portion of Asia; few birds have gained a greater share of notoriety. With the ancient Romans it was a bird of augury, and they regarded its flight and its hoarse croak, with its various actions, as presages either of good or evil. The Danes adopted it as their military standard, designing to impress their foes with the notion of coming destruction, and that their intention was to give their dead bodies to the fowls of the air; such accorded with the superstition of the mass of people, the Raven's very presence seeming to forebode disease, calamity, and death. How general this notion was we notice from its association in "Macbeth" with the horrors of coming desolation—

> "The raven himself is hoarse,
> That croaks the fatal entrance of Duncan
> Under my battlements."

The Raven is a bold bird, hardy and powerful, in its habits omnivorous, not only feeding on carrion but attacking ducks, chickens, and small quadrupeds, which its strong pointed beak enables it to despatch with a few strokes. It even attacks young lambs

* Classification of Birds.

and sickly sheep, picking out their eyes, and leaving them to a miserable lingering death. In addition to these, eggs, grain, grubs, reptiles, and shelled mollusks are among the articles of its bill of fare. It sometimes visits the sea-shore in search of putrid fish and animal exuviæ.

The favourite resorts of this bird are bold mountain precipices, where, in some inaccessible ledge, or as has been seen, on the branches of some stunted yew-tree, starting as it were out of the rifts of the tremendous precipice, it builds its nest, occupying the same spot for a long succession of years. In districts where the character of the scenery is different, it makes its nest in tall trees, which it annually visits for the same purpose. The nest is formed of sticks, and lined with wool. The eggs, from five to seven in number, are of a dark green, blotched with black. Ravens are generally seen, like the Crow, in pairs, but sometimes during the winter in small companies of eight or ten; their flight is high, and they often wheel and tumble in the air. This bird, arrayed in glossy blue-black plumage, is often kept tame, and soon becomes very familiar; often, indeed, mischievously so, from its propensity to secrete glittering articles, as keys, glass, silver, and the like; nor are eggs or the poultry of the yard quite secure from its incursions. It is very daring in self-defence. Mr. Thompson states that one which lived in the yard attached to the chief inn at Antrim for about fifteen years, had occasional encounters with game-cocks brought thither to engage it, and bets were pending on the issue. The Raven in every instance proved the victor; it avoided the blows of the

cock, and acted only on the defensive until it could manage to lay hold of the cock's head, which was in an instant crushed in its powerful beak, its antagonist falling lifeless on the ground.

The Rook (*Corvus frugilegus*) is spread over the greater portion of Europe, wherever suitable districts invite its colonization. Wooded and cultivated tracts of country are its favourite haunts, and it is specially abundant in our sea-girt island. It is singularly gregarious in its habits, large flocks being constantly seen dispersing themselves over pastures and corn-fields in search of their peculiar food. Where the plough turns up the underlying soil, or the harrow tears open the unbroken clods, there they are seen picking up the grubs, the larvæ of the chaffer-beetle *(Melolantha vulgaris)* and of the Harry-long-legs *(Tipula oleracea)*, both very destructive to the roots of grain and clover. In this respect they render to the farmer great service, far outweighing the mischief they may do in fields where the young wheat just shows itself above the ground, or by picking up the recently planted "sets" of potatoes, to the injury of the crop. Indeed, the name of Corn-eater or Corn-gatherer *(frugilegus)* is inappropriately given to the Rook, for Mr. Selby affirms that in all places where Rooks have been exterminated, there very great injury has resulted to corn and other crops, from the devastation made by the grub and caterpillar being unchecked. Sometimes, undoubtedly, the Rook does much damage in gardens, from its fondness for pears and cherries when ripe, stripping the trees entirely; also from its partiality for walnuts. But careful watching at the proper time

will prevent all the mischief which this bird commits, and thus secure its invaluable services without being subjected to its depredations. When on their foraging excursions, Rooks display much cunning and precaution; they appoint sentinels to take their station at various posts around the main body, and at the cry of any of these all rise upon the wing and sail away. The appearance of a gun is sufficient to disturb them, and hence it is said that "rooks smell powder." On the approach of evening, long strings of the birds may be seen at a considerable elevation wending their way to their roosting-place. In early spring they are all on the alert, busy in their rookery, repairing the old nests and building new ones; all is noise and bustle, and numerous are the squabbles about the right of sticks and wool, till the nests are all finally completed. When the females begin to lay, they are fed by the males, and, as Gilbert White says, receive their bounty with a fond tremulous voice and fluttering wings, and all the little blandishments that are expressed by the young in a helpless state. This gallant behaviour of the males is continued during the whole season of incubation.

In the genus *Corvus*, as exemplified in the common Carrion Crow (*Corvus corone*), the bill is somewhat lengthened and strong, and well suited for digging into the ground, or for pushing or breaking hard substances; the tip of the upper mandible slightly inflexed over the lower; obsoletely or not at all notched; culmen elevated, and slightly curved from the base. Nostrils covered and concealed with stiff, lengthened, incumbent bristles. The wings long and pointed; the

first, second, and third quills graduated. Tail even, or slightly rounded.

As their food is principally found upon the ground, they are provided with strong walking feet; and as they are gregarious and breed together in large societies on the tops of the loftiest trees for greater safety, the structure of their feet is such as to give them stability on such an elevated and slender perch. The foot of the true ground bird has the hallux, or hind toe, elevated on the tarsus above the articulation of those in front, and the lateral toes are of equal size, and the claws are less curved than in the perching birds. The birds of this genus which do not resort to the ground, as the Jays, exhibit a more arboreal character of foot, having the lateral toes unequal in length, and the claws have a greater degree of curvature.

The plumage of the Carrion or common Black Crow is entirely black, with few or no metallic reflections. It is a foul and miscellaneous feeder, as its name imports, and is very generally distributed.

Carrion Crows nestle in trees, generally in more retired places and farther apart from each other than Rooks. They generally pass the summer in extensive forests, from which they occasionally emerge to procure subsistence for themselves and their infant brood. They feed on flesh, eggs, worms, insects, and various kinds of grain, but they are particularly fond of carrion. In spring they greedily devour the eggs of partridges and quails, and are so dexterous as to pierce them and carry them on the point of their bill to their young; even fish and fruit are not unsuitable

to their palate. They often attack the eyes of dying animals, destroy weakly lambs, and, when pressed with hunger, will even pursue birds on the wing. They are notorious for the havoc which they occasion among game and poultry, and in rabbit-warrens, where they kill and devour the young. When hens lay their eggs in hedge bottoms or farm-yards, Crows are often caught in the act of devouring them; but when they happen to be satiated, they will frequently hide their food till hunger becomes more urgent.

During the winter these birds consort with the Rooks and Hooded Crows, and sometimes intermingle with the latter, so as to give rise to a hybrid race. In this season, numerous flights of various species of the first genus assemble about our dwellings, keeping much on the ground, sauntering much about the flocks and shepherds, hovering near the tracks of the labourers, and sometimes hopping on the backs of pigs and sheep, with such apparent familiarity that they might be mistaken for domestic birds. At night they retire into the forests to lodge among the large trees, resorting to the general rendezvous from every quarter, sometimes from the distance of nine miles all around, whence they again sally out in the morning in quest of subsistence.*

As they are exceedingly cunning, have an acute scent, and commonly fly in large flocks, it is difficult to get near them, and still more so to decoy them into snares. Many contrivances have been resorted to to destroy them; the most innocuous as well as ludicrous in its effect is the following:—A piece of paper is

* British Cyclopædia.

rolled up in the shape of a case, and baited with a piece of raw flesh; as the Crow introduces his head to devour the bait, which is in the narrow part, the paper, being besmeared with birdlime, sticks to the feathers of the neck, and he remains hooded; unable to rid his eyes of the bandage, he rises perpendicularly into the air, the better to avoid striking against anything, until, quite exhausted, he sinks down, always near the spot from which he mounted.

The Chough (*Corvus Graculus*) called the Cornish Chough, from its frequenting that county more than any other in Britain, is a less powerful bird than the Crow, and resorts generally to the sea-coasts, especially those that are washed by the Atlantic and the Channel, where there are rocks or lofty ruins to serve it for resting-places.

The Chough is black, with a tinge of violet, and the bill and legs are red. The bill being much weaker than that of the Crows in general, and curved nearly the whole of its length, is not adapted for the hard lábour that those birds have sometimes to perform, its food is therefore of a somewhat different character; and as its claws are sharp and crooked, partaking more of a prehensile than scraping character, it is evidently a surface-feeder, and its food animal or soft vegetable matter, or both. There is much of these to be picked up on the shores, or the banks of rivers at the reflux of the waters, and there the Chough is to be found. It is likewise said to be fond of those wild berries which are generally abundant in the humid or marshy parts of the uplands, and these furnish it at least with a seasonal supply. It is said also to

feed on juniper berries. The nest is formed in the crevices of rocks about midway up the cliff, so as to be out of reach of danger both from below and above. The eggs are usually about four or five in number, rather longer than those of the Jackdaw, of a dull white colour, with spots of ash colour and pale brown.

Mr. Macgillivray, in his "History of British Birds," has given the following characteristic sketch of the habits of the Magpie. It is generally distributed in Britain, being more or less common in all the cultivated and wooded districts of England and Scotland, both in the interior and along the coast, although nowhere numerous, on account of the hostility of gamekeepers, gardeners, and sportsmen of all degrees. There, on the old ash that shadows the farm-yard, you may see a pair, one perched on the topmost twig, the other hopping among the branches, uttering an incessant chatter of short hard notes, scarcely resembling anything else in nature, but withal not unpleasant, at least to the lover of birds. How gracefully she of the top twig swings in the breeze. Off she starts, and directing her flight towards the fir wood opposite, proceeds with a steady, moderately rapid, but rather heavy flight, performed by quick beats of her apparently short wings, intermitted for a moment at intervals. Chattering by the way, she seems to call her mate after her; but he, intent on something which he has spied, hops downwards from twig to branch, and descends to the ground. Raising his body as high as possible, and carrying his tail inclined upwards, to avoid contact with the moist grass, he walks a few paces, and spying an earthworm half protruding from

its hole, drags it out by a sudden jerk, breaks it in pieces, and swallows it. Now under the hedge he has found a snail, which he will presently detach from its shell; but something among the bushes has startled him, and lightly he springs upwards, chattering the while, to regain his favourite tree. It is a cat, which, not less frightened than himself, runs off towards the house. The Magpie again descends, steps slowly over the green, looking from side to side, stops and listens, advances rapidly by a succession of leaps, and encounters a whole brood of chickens, with their mother at their heels. Were they unprotected how deliciously would the Magpie feast; but, alas! it is vain to think it, for, with fury in her eye, bristled plumage, and loud clamour, headlong rushes the hen, overturning two of her younglings, when the enemy suddenly wheels round, avoiding the encounter, and flies after his mate.

The food of the Magpie consists of testaceous mollusca, slugs, larvæ, worms, young birds, eggs, small quadrupeds, carrion, sometimes grain and fruits of different kinds, in search of which it frequents the fields, hedges, thickets, and orchards, occasionally visits the farm-yard, prowls among the stacks, perches on the housetop, whence it sallies at times and examines the dunghill and places around. Although it searches for larvæ and worms in the ploughed fields, it never ventures, like the Rook and several species of Gull, to follow the plough as it turns over each successive furrow.

On the ground it generally walks in the same manner as the Crows, but occasionally leaps in a side-

long direction. It generally keeps in pairs all the year round, accompanies its young for some weeks after they first come abroad, and after the breeding season, retires at night to the copses or woods, where sometimes a considerable number meet together.

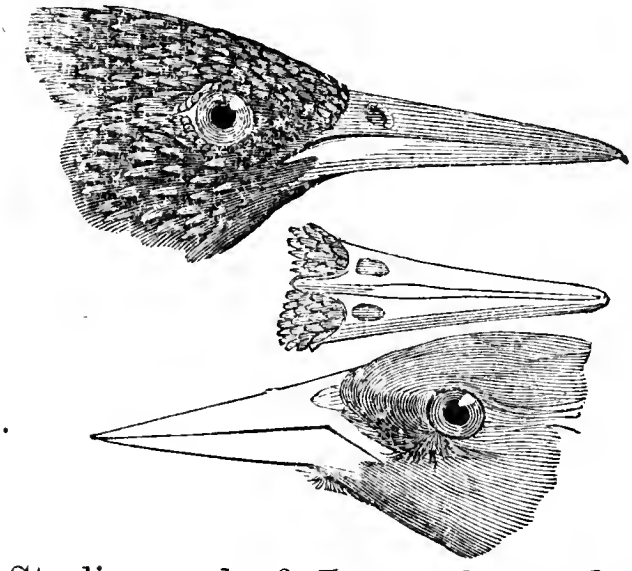
Closely resembling the *Sturnidæ*, or Starlings, in the form of its bill, the Nutcracker *(Nucifraga)* may be considered as the aberrant form of the present family. One species, the *Nucifraga guttata*, is not uncommon on the continent of Europe, but is a rare visitant to Britain. It is a handsome bird, about the size of a Magpie, or about thirteen inches in length, and a foot and a half in the stretch of the wings. The bill is perfectly straight and conic; the base being dilated, and dividing the frontal feathers; the tongue is long and forked at the tip. The general colour of the body is dusky brown, marked all over with triangular white spots. The crown of the head, wings, and tail are blackish, the latter marked with white at the tip; bill and legs dusky.

The Nutcracker seems to bear some resemblance to the genus *Picus*, in its capacity of ascending the trunks of trees, and in feeding on the various insects and larvæ that inhabit the bark and wood. It feeds likewise upon the kernels of nuts, acorns, beech-mast, the seeds of the *Coniferæ*, and other vegetable substances, which, in consequence of the hardness of their envelopes, remain on the ground for a considerable time, and serve as a store for nearly the whole season. The hardest of these it can readily break, and it is for this reason that it is called the Nutcracker. It resorts to mountainous districts, where

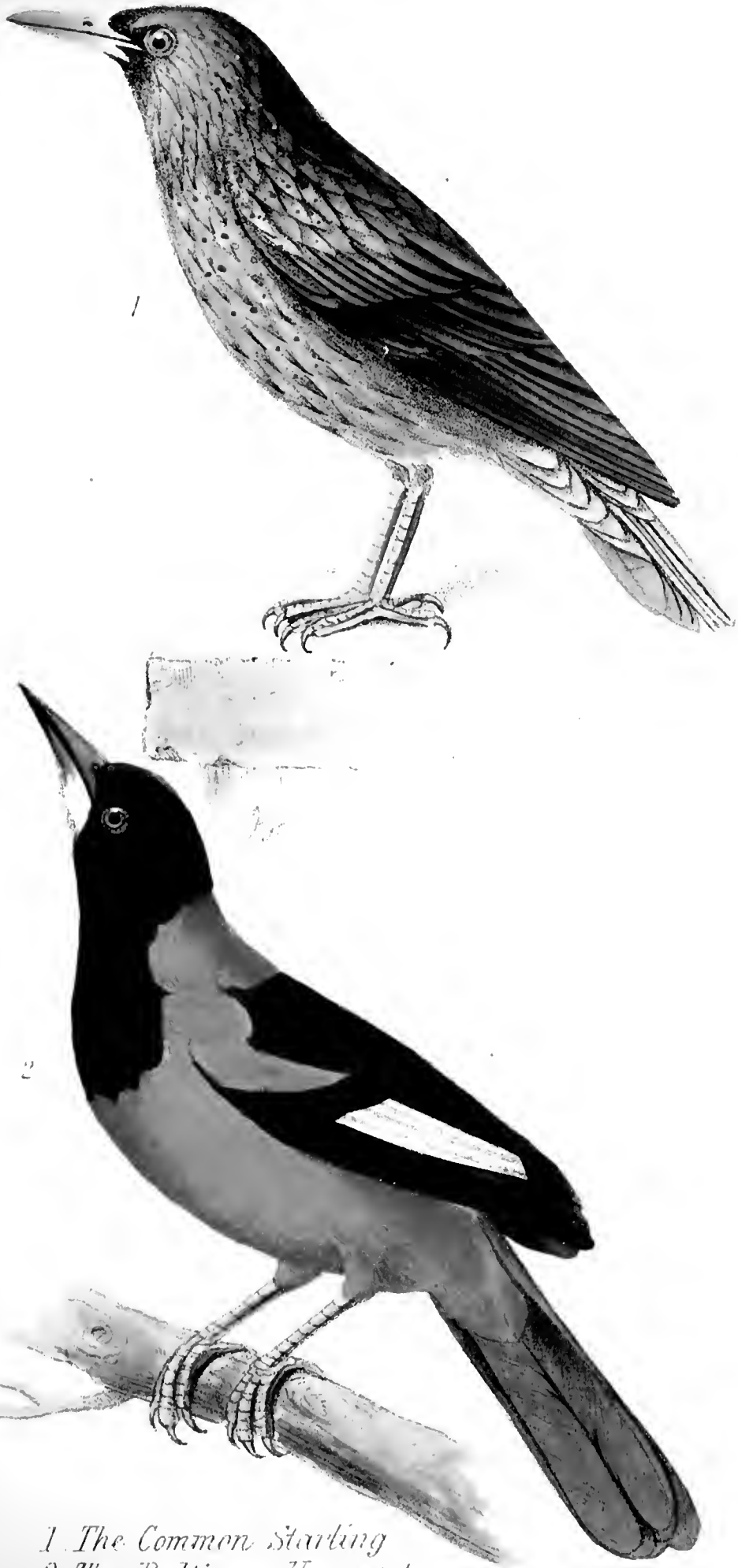
it dwells amongst the forests on the elevated slopes. From the retired nature of its habits very little is known of its domestic economy. It is said to nestle in the holes of trees, and where these are not to be met with suitable to the purpose, it is said to be capable of working them to the desired shape, or even of excavating one itself.

Starlings.

In the Starlings (*Sturnidæ*), the bill exhibits a nearer approach to a conic form, some of the genera, indeed, have the bill perfectly conic, such as the Hangnests (*Icterinæ*) and Maize Birds (*Aglainæ*), which conduct us to the next or typical family of the conirostral birds. The bills of the common Starling and of *Icterus hæmorrhous*, represented in the cut, will serve to illustrate the general form, although there are considerable modifications of form and structure exhibited in different groups of this family.



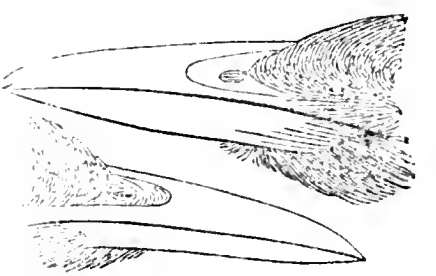
The family of *Sturnidæ*, Mr. Vigors observes, embraces a considerable number of groups, approaching each other in their gregarious and migratory habits. They are found in every part of the globe, united in large flocks, carrying destruction among the cultivated fields, and following herds of cattle for the sake of the insects or grains which they may pick up from their bodies, or in their neighbourhood. In addition to the American genus *Icterus*, and the contiguous



1 The Common Starling
2 The Baltimore Hangnest

genera *Cassicus* and *Zanthornis* of M. Brisson, together with *Pendulinus*, Vieill., and several corresponding groups, we may observe the genus *Amblyramphus*, Leach, united to the family, as also the *Buphaga*, Linn., and *Pastor* and *Lamprotornis*. The whole of the family, united by their manners and straight and conical form of the beak, the ridge of which passes back to some extent over the forehead, may be observed, by those who cast even a casual glance over the three adjoining groups, to hold an intermediate rank between the weaker conformation of the *Fringillidæ* and the more powerful structure of the *Corvidæ*.*

An interesting group in this family is formed by the Grackles (*Lamprotorninæ*). They are birds of handsome plumage, being generally black, glossed with the most beautiful metallic lustres of green and blue. The uncommon brilliancy of the plumage of some of the species induced many naturalists to associate them with the Paradise Birds. The whole group appears to be confined to the tropics of Asia and Africa. They are gregarious, appearing in numerous flocks, and destroy the countless hosts of locusts and other large species of insects that are destructive to the produce of the fields in those warm regions. The chief peculiarities of the Grackles consist in a strong thrush-like bill, generally notched, but never angulated at the base, as in the



* On the Natural Affinities that connect the Orders and Families of Birds: Vigors.

Icterinæ; the feet are large, the middle front toe being shorter than the tarsus, and united to the outer at the base; the first quill in the wing is merely rudimental, and the second and third the longest.

Indigenous to Southern America is another interesting group, forming the sub-family *Icterinæ*, or Hangnests. Like the rest of the tribe, they are gregarious and wary. They are never, however, according to Mr. Swainson, seen upon the ground, but feed upon fruits and coleopterous insects, which they find upon the trees. They are conspicuous for the ingenuity they display in the construction of their nests, which are of a long purse-like form, of laborious and elegant structure, and suspended from the slender branches of lofty trees. The bill in some of the species is large, very thick at the base, remarkably pointed at the tip, and completely conic; the upper mandible is expanded at its base into a broad oval plate, which advances far on the front, and divides the frontal feathers. The commissure is straight, but angulated at the base.

The most remarkable feature in the economy of these birds is the mode in which they construct their nests. Some of the birds being of a large size, nearly as big again as a thrush, require a large nest, and it is frequently found measuring between four and five feet in depth. It is a beautiful and novel sight to the European, says Mr. Swainson, to see hundreds of these pensile fabrics suspended from the extremity of the branches of a single tree, generally the most lofty, and accompanied by the birds themselves, either thickly crowded on the branches, or going and re-

turning in all directions, the vivid yellow and black, or black and red of their plumage, giving a splendour to the animation of the scene, which does not belong to the rookeries of Europe. There can be no doubt that pendulous nests, which are much more common in tropical than in temperate latitudes, are admirably calculated to guard the eggs and young, not only from the numerous snakes which frequent trees, but also from the insidious arts of the cuckoos, or the marauding habits of the bush-shrikes and the toucans. Few of these birds equal the Baltimore Hangnest (*Icterus Baltimore*) in the construction of this receptacle for its young, and in giving to it in such a superior degree convenience, warmth, and security. For these purposes, Wilson observes, he generally fixes on the high bending extremities of the branches, fastening strong strings of hemp or flax round two forked twigs corresponding to the intended width of the nest; with the same materials, mixed with quantities of loose tow, he interweaves or fabricates a strong or firm kind of cloth, not unlike the substance of a hat in its raw state, forming it into a pouch of six or seven inches in depth, lining it substantially with various soft substances, well interwoven with the outward netting; it, lastly, finishes with a layer of horsehair; the whole being shaded from the sun and rain by a natural pent-house or canopy of leaves. So solicitous is the Baltimore to procure proper materials for his nest, that, in the season of building, the women in the country are under the necessity of narrowly watching their thread that may chance to be out bleaching, and the farmer to secure his young

grafts; as the Baltimore finding the former, and the strings which tie the latter, so well adapted for his purpose, frequently carries off both; or, should the one be over heavy, and the other too firmly tied, he will tug at them a considerable time before he gives up the attempt. Skeins of silk and hanks of thread have been often found, after the leaves were fallen, hanging round the Baltimore's nest.

The Baltimore bird is so called from its colours, which are black and orange, being, says Catesby, those of the arms or livery of Lord Baltimore, formerly the proprietor of Maryland. It inhabits North America from Canada to Mexico, and is even found so far south as Brazil.

Wilson describes the note of this bird as a clear mellow whistle, repeated at short intervals as he gleans among the branches. There is in it a certain wild plaintiveness and naïveté extremely interesting; and it is uttered with the pleasing tranquillity of a careless plough-boy, whistling merely for his own amusement.

The Baltimore is a migratory bird, and arrives in the more temperate portions of America in the spring. Its flight is straight and continuous. The plumage of the male bird is not mature until the third spring, when the colours are, as described by Audubon, the following: bill and feet light blue, iris-orange. Head, throat, back part of the neck, quills, and larger secondaries, black, as are the two middle tail-feathers, and the base of all the rest. The whole under-parts, the lesser wing-coverts, and the posterior part of the back, bright orange, deeply tinged with vermilion on

the breast and neck. The tips of the two middle tail feathers and the terminal ends of the others, of a duller orange. Quills, excepting the first, margined with white. Length, seven inches and three-quarters.

The Cow-troopial *(Icterus pecoris)*, is another bird of this family. Like our Cuckoo this bird prepares no nest itself, but makes choice of those of other birds, wherein to deposit its eggs, laying only one in each, which it leaves to be hatched by them, and relinquishes the rearing of the young one to the care of the foster-parents. It seems to have its favourite nests; for it prefers those of the Fly-catcher's, red and white-eyed, and that of the Maryland yellow-throat: yet it does not refuse to make use of those of the Blue-bird, the Blue-eyed yellow warbler, the Blue-grey Fly-catcher, the Chipping-sparrow, the Golden-crowned thrush, Wilson's Thrush, and the Indigo-bird. Nuttall tells us, that "when the female is disposed to lay, she appears restless and dejected, and separates from the unregarding flock. Stealing through woods and thickets, she pries into the bushes and brambles for the nest that suits her, into which she darts, in the absence of its owner, and in a few minutes is seen to rise on the wing, cheerful and relieved from the anxiety that oppressed her, and proceeds back to the flock she had so reluctantly forsaken. If the egg be deposited in the nest alone, it is uniformly forsaken; but if the nursing-parent have any of her own, she immediately begins to sit. The Red-eyed Fly-catcher, in whose beautiful basket-like nests I have observed these eggs, proves a very affectionate and assiduous nurse to the uncouth foundling."

Mr. Nuttall says that, in 1831, he saw a hen red-eyed Fly-catcher sitting on two eggs, and one of the Cow-bird; and that the Vireosylva olivacea of Buonaparte appears to be its most usual nurse. He states that this Vireo has sometimes begun her incubation with only an egg of each kind, while in other nests he has seen as many as three eggs of the Vireo, as well as that laid by the Cow-bird: he suggests, in explanation, that, from the largeness of the egg, the nest probably immediately feels full to the incubating bird, so as to lead her to sit directly, when the larger egg, being brought nearer to the body of the nurse than her own, is first hatched, generally, as he believes, on the twelfth or thirteenth day. The legitimate eggs are hatched about a day later, and the young are often stifled by the superior size of the stranger, which is affectionately nursed by the poor dupe of a dam. When the young are dead, they are conveyed to a distance by the parent, and dropped; but they are never found immediately below the nest, which would be the case if they were ejected by the young Cow-bird,—as is done by the young Cuckoo. Indeed, so far as Mr. Nuttall had the opportunity of observing, the foundling shows no hostility to the natural brood of his nurses; but he nearly takes up their whole attention, and early displays his characteristic cries and self-possession. When fully fledged they quickly desert their foster-parent, and skulk about in the woods, until at length they instinctively join company with those of the same feather; and now, becoming more bold, are seen in parties of five or six, in the fields and lanes, gleaning their accustomed subsistence.

They still, however, appear shy and watchful, and seem too selfish to study any thing more than their own security and advantage.

The Cow-troopial is only a poor songster. The species is migratory; it appears in the middle and northern states of the Union, at the beginning of April, and retires southwards on the approach of winter. The male has the head and neck blackish-brown, the rest of the plumage glossy black, with greenish reflections on the upper parts, and a violet lustre on the breast. The female is sooty-brown above, and pale beneath, as are also the young, with the breast spotted.

The Rice-Bunting *(Dolichonyx orizivora)* is another species of this family, and is familiarly known throughout the whole of North America, from the Saskatchewan river to Mexico; flocks arrive there in March from their winter-quarters, the West India Islands, and scatter themselves over the savannahs and meadows, and newly-ploughed lands, where they feed on insects and their larvæ, as well as on the tender wheat and early barley. They are gregarious, associating together in immense flocks; the males giving rapid voluble utterance to a strain in chorus, all ceasing simultaneously.

Near the middle of May the Rice-Buntings arrive in the State of New York, and immediately pair and prepare their nests. At this season the male birds pour forth their song in the air, ascending and descending in successive jerks. The nest is placed amongst the grass, or in a field of wheat or barley, on the ground, and is composed of dry grasses and leaves,

lined with finer materials; the eggs, five in number, are dull bluish white, spotted with blackish.

In July, when the young are reared, these Rice-Buntings congregate in multitudes of incredible magnitude, and commence their extensive devastations. They plunder the fields of grain; they swarm about seed-beds, alighting in thousands, bearing down the stems with their weight, and feeding on the ripe seeds. They progress towards the Southern States, and in September they make their appearance in Carolina in countless myriads, spreading over the rice-fields, and devouring the grain while yet soft and milky; and thus they often ruin acres of this produce. From the time of their assembling together in July, to September, the gun thins their numbers; thousands are killed for the markets, their flesh being esteemed quite a delicacy. Towards the end of October, before the rice-crop is gathered in, the troops have made their appearance in Cuba and Jamaica; where they feed on the seeds of the guinea-grass, and where the birds, being very fat, are in great demand for the table.

This bird, called also the Rice-Troopial, is subject to a double yearly moult and change of colouring. The male, in his spring dress, has the head, fore-part of the back, shoulders, wings, and tail, together with the whole of the under plumage, black, passing on the middle of the back into greyish; scapulars, rump, and upper tail-coverts white; back of the neck ochre yellow. Bill, bluish black; but in the autumn pale flesh-colour, as in the female and young male. The feathers of the tail are sharp at the end, as in the Woodpecker.

The female (whose plumage the adult male assumes after the breeding season) has the back streaked with brownish-black, and the whole of the under-parts of a dirty yellow.

The Common Starling (*Sturnus vulgaris*) is a bird well-known to all. It is generally dispersed over Europe; and is also found in China, the Himalaya, the Cape of Good Hope, and the northern parts of Africa. It is very common in our islands, and it is frequently kept in confinement; in which condition it becomes very familiar, learns to give expression to some tunes, to utter words, and even sentences. A low sweet warble is its natural song.

During the breeding season, Starlings live only in pairs. They build their nests in the crevices of towers, steeples, old ruins, and in the clefts of rocks; and sometimes they will take possession of the abandoned nests of crows. The eggs are of a pale blue colour.

When the breeding season has come to a close, then Starlings assemble themselves in immense numbers; they then also often mix themselves up with rooks, and we may see them scattered over the fields searching for food. They mix without fear among herds or flocks of grazing cattle, where they are attracted by the insects which settle on the hides of the animals or creep about on the ground. As the evening approaches and becomes dusk, the multitudes previously scattered far and wide re-collect into one vast assembly, and are seen wheeling and sweeping through the air, and executing the most beautiful aërial evolutions, as though in obedience to some fixed

signals of command, while the whole troop bears onward to some chosen place of rest and repose. The locality thus made choice of is usually a thick spinet or coppice, or extensive reed-bed, and over this the mass of birds wheels about in varying figures, at one time sinking, at another rising, again suddenly turning, until at length the entire flock settles down for the night, keeping up a long, noisy, chattering concert.

Mr. W. Thompson states that in Ireland the Starling is a migratory bird, and that their southward movement begins about the end of September. In our island the Starling is undoubtedly partially migratory, leaving one part of the country and going to another; and we cannot hesitate to conclude that flocks of them do quit our shores and take up their abode in more southern climes.

This bird passes through several stages before it attains its permanent plumage. Throughout the first autumn the young are of a uniform ashy brown. In the month of October they put on a plumage of black, with bronze, violet, and green reflections in each feather, except the quill and tail-feathers, being tipped with a spot of yellowish white. This state of their plumage lasts till the third year; then the bill becomes yellow, and the throat and chest are covered with loose lanceolate feathers, of a rich black, with purple and golden-green reflections. The head and under-parts are of this hue also. The back is greenish-black, with small triangular spots of reddish-white. This is the permanent condition of the plumage.

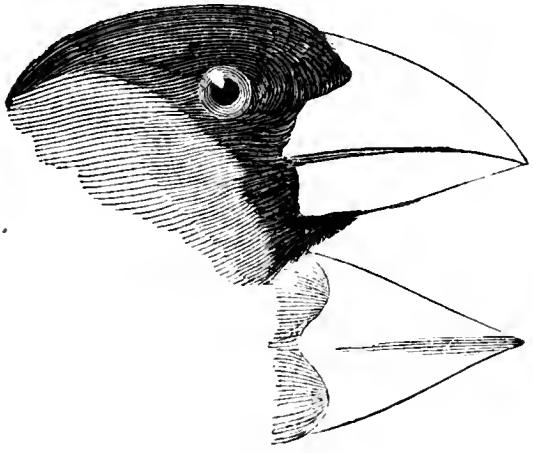
1. The Hawfinch

Finches.

We have now arrived at the typical family of the *Conirostres*, or that group of birds whose bill assumes in the greatest degree a conical form; namely, the Finches, *Fringillidæ*. They are the most extensive in number, as well as the smallest in size, of any in the whole tribe. They inhabit all parts of the globe, feeding principally upon the seeds of plants, or the kernels of fruits, which their peculiar organization enables them to procure and devour with facility. Their grand office in the economy of Nature appears to be to assist, and that in no small degree, in keeping down the excess of certain forms of vegetation, subsisting as they do, in many instances, on the germs of life so copiously and abundantly distributed by various plants, chiefly of the composite and cruciform races, the extreme and exuberant fertility of which would otherwise enable them to usurp dominion over every other, and so monopolize the soil as to render it unfit for cultivation. The adaptation, however, as in all similar cases, is of course mutual, and the apparent superfluity of seeds which are annually produced, thus enables thousands and millions of beings to enjoy existence, to enliven and diversify the face of nature with moving life, and to cheer the still monotony of vegetable beauty by their lively and inspiring songs of joy and happiness.*

* "British Cyclopædia."

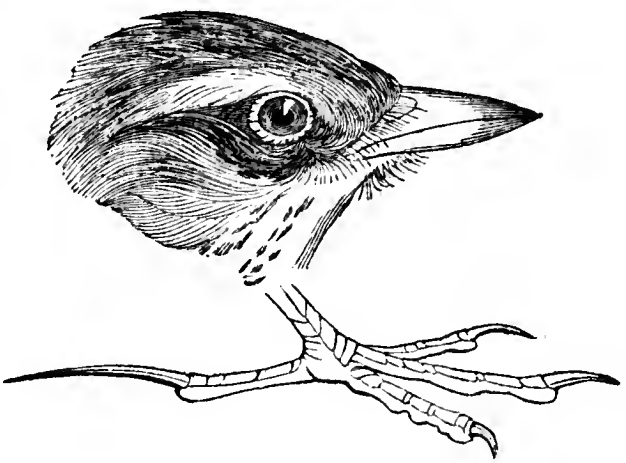
The principal character which distinguishes these birds from all others is the conic form, strength, and comparative shortness of the bill, which is most highly developed in the genus *coccothraustes*. In the sub-families, genera, and sub-genera, that serve to connect these birds with the neighbouring groups, a gradual modification in the form of the bill may be observed; they are all admirably fitted for gathering or picking up, and crushing the different grains and berries, fruits and kernels upon which they feed, and some of them exhibit a peculiar and beautiful adaptation, which enables them to wrench from their pedicles the firmly-rooted seeds of the fir-cones, or to divide the hardest shells. In some of the species the colours are exceedingly rich and bright, and beautifully combined; but in many they are dull and inconspicuous. The legs are of moderate length, and the three toes which are in front are cleft to their base, so that the birds can freely move both upon the ground and among trees. The species are so very numerous that no general description will apply equally to the whole group: some of the individual peculiarities will be described as we proceed in noticing the principal subordinate divisions.



The species of this family, as just observed, are very numerous, and the similitude that many of them

bear to some of the aberrant groups of the preceding tribe or family are so striking and various, that it is doubtful which is the group most nearly allied to them. We consider, however, that the *alaudinæ* is the more aberrant group of the present family; and that as the *coccothraustinæ* exhibit in the form and structure of their bill the greatest strength, and closest resemblance to a cone, the several sub-families will arrange themselves as follow; viz., *Alaudinæ* (Larks), *Fringillinæ* (Ground Finches), *Coccothraustinæ* (or Grosbeaks), *Tanagrinæ* (or Tanagers), and *Pyrrhulinæ* (or Bull-finches).

The characteristic features of the Larks at once distinguish them from the other groups. The bill, although conic, is much more slender than in any other birds of the family. The legs and feet are more peculiarly adapted for walking, or for running on grass or uneven surfaces; the claws being uncommonly straight and lengthened, more especially the hinder one, which is either nearly straight or very slightly curved. The uniformity of colouring which prevails generally amongst the Larks is another adaptation to their haunts, and is one out of the numberless instances of that harmonious design which marks the visible creation. Continually exposed, from the character of their haunts,



to the observation of birds of prey and other enemies, the colouring of these birds has been assimilated so nearly to that of the ground, that they can scarcely be distinguished, even when close, by an ordinary observer; and however keen may be the sight of a hawk, the plumage of the Lark is so exactly like the earth upon which it moves, that although its presence might be detected by watching, it would never attract a passing enemy. The food of the Lark consists of grain and different seeds; worms and other insects, as well as the tender blades of grass, form likewise a portion of its fare.

The genus by which the junction is effected between the Larks and the *Sturnidæ*, appears to be *Macronyx* of Swainson, the Crescent-larks of Africa, or *Alauda Magna* of Linnæus, and of the American ornithologists. The similarity of the latter bird to the Starlings is so apparent as to have caused their being placed amongst them by modern naturalists. Wilson, however, remarks that in the particular form of his bill, in his manners, plumage, mode and place of building his nest, Nature has clearly pointed out his proper family. Audubon calls it the Meadow Lark, or American Starling; but whether it be a member of the *Sturnidæ* or of the *Alaudinæ*, the affinity between the two groups appears to be remarkably close.

Two species only of this sub-family, the Skylark and the Woodlark, resort to Great Britain. The latter is by no means so abundant a species as the former; neither is its sweetly-warbled song so generally heard. It is confined to the southern and western parts of England, and according to Montagu

is most numerous in Devonshire. The melodious richness of its song is scarcely equalled by any of the warblers; and far surpasses in softness and melody the more varied song of the Skylark.

The Skylark (*Alauda arvensis*) is spread very generally over Europe, different parts of Asia, and the northern part of Africa. The localities it most delights in are extensive arable lands and open meadows; but in Ireland, Mr. Thompson says, it is equally well pleased with the wild mountain pasture. At times this favourite songster will sing while at rest in a clod of earth, but most commonly it sends forth its sweet song while floating in the boundless space above; it rises in a spiral manner on quivering wings, trilling forth its animated and varied lay, mounting up higher and higher, until it seems to the beholder a mere speck in the clear blue firmament of heaven. It descends in an oblique manner, and at first gradually, but when it arrives within twenty or thirty yards of the ground, it ceases its strain, and then sweeps down suddenly to join its mate.

The Skylark breeds in the month of April, or early in May, forming its nest of the stalks of vegetables and dried grasses, and lining it with fine fibres, upon the ground, amongst corn or other herbage. The eggs are of a greenish white, spotted with brown: two broods are reared annually, the second in July or August. The common flight of this bird is easy and undulating, and on the ground it trips along with great facility, its feet, and especially the elongated slender hind-claw, expressly adapting it for the grassy surface of the field. It lives for the most

part on insects, worms, grain and other seeds, the leaves of the clover, etc.

When winter draws near they are seen to assemble in innumerable flocks, increasing in magnitude as the weather becomes more severe by arrivals from colder regions; they habitually frequent stubble-fields, turnip-fields, and such-like situations, and being considered a delicacy for the table, large quantities are caught at this period of the year by means of nets, and despatched to the London market. Dunstable is a noted place of resort for Larks, where multitudes are captured; besides which many are brought from Holland. The Skylark has formed the theme of many a poet's lay. We quote one, from the writings of James Hogg:

"Bird of the wilderness
Blithsome and cumberless,
Sweet be thy matin o'er moorland and lea!
Emblem of happiness,
Blest is thy dwelling-place—
O to abide in the desert with thee!
Wild is thy lay, and loud,
Far in the downy cloud,
Love gives it energy, love gave it birth.
Where, on thy dewy wing,
Where art thou journeying?
Thy lay is in Heaven, thy love is on earth.

O'er fell and fountain sheen,
O'er moor and mountain green,
O'er the red streamer that heralds the day,
Over the cloudlet dim,
Over the rainbow's rim,
Musical cherub, soar, sing away!
Then, when the gloming comes,
Low in the heather blooms,
Sweet will thy welcome and bed of love be!
Emblem of happiness,
Blest is thy dwelling-place,—
O to abide in the desert with thee!"

Here is another, of a different character, from the pen of Wordsworth, the poet of Nature :

"Ethereal minstrel! pilgrim of the sky!
Dost thou despise the earth where cares abound?
Or, while the wings aspire, are heart and eye
Both with thy nest upon the dewy ground?
Thy nest, which thou canst drop into at will,
Those quivering wings composed, that music still!

To the last point of vision, and beyond,
Mount, daring warbler! that love-prompted strain
('Twixt thee and thine a never-failing bond),
Thrills not the less the bosom of the plain;
Yet might'st thou seem, proud privilege! to sing
All independent of the leafy spring.

Leave to the Nightingale her shady wood,—
A privacy of glorious light is thine;
Whence thou dost pour upon the world a flood
Of harmony, with instinct more divine:
Type of the wise who soar, but never roam;
True to the kindred points of Heaven and Home."

The Woodlark *(Alauda arborea)* is found over every part of Europe, even as far north as Sweden; in colder countries it is migratory, but not in those which are more temperate. In our island it abounds most in the midland and southern districts, if not, as before stated, almost confined to them. It frequents wooded and well-cultivated parts of the country. It generally gives utterance to its song when it is on the wing, often continuing it for an hour without intermission, while all the time it is describing a series of widely-extended circles. Occasionally it pours forth its strain when perched on the branch of a decaying tree. It breeds in April; placing its nest under the shelter of a dwarf shrub or tuft of herbage. The nest itself is constructed of dried stalks and grass,

lined with fibres and hair. The eggs are of a pale wood-brown, marked with blotches of grey and dark brown. This species does not associate in flocks in winter, as the Skylark does, but in little families of five or seven individuals, which separate on the approach of spring, or soon after Christmas; when, if the weather be mild, the males begin to utter their song.

1 Crossbeak.
2. Bullfinch.

Ground Finches.

The Bunting, the Chaffinch, and the Sparrow, are examples of the *Fringillinæ*, or Ground Finches. The *Fringillinæ*, Mr. Swainson observes, may be correctly termed Ground Finches; since with scarcely any exception, they are all birds which habitually walk or hop in such situations, and derive their chief sustenance from seeds of grasses and other plants. Like the generality of birds which live upon the ground, the plumage of nearly all the *Fringillinæ* is of an earthy colour, that is, of different shades of brown, variegated with blackish spots or markings; while their legs are light coloured. The geographic distribution of these birds is chiefly in the cold and temperate regions of Europe, Asia, and North America; very few, in comparison, are found in South America; and none have yet been discovered in Australia.*

The union of the *Fringillinæ* with the *Alaudinæ* is clearly effected by the genus *Plectrophanes*, or Lark-Buntings, which have the bill of *Emberiza* united to that structure of foot so peculiar to the birds composing the latter group.

There is a peculiarity in the bill of the Buntings which enables them with great facility to crack the husks or shells of the different seeds and berries on which they feed, and with the aid of the tongue to

* Classification of Birds.

extricate the kernel or farinaceous portion. The bill is conical in form, strong, hard, and sharp pointed, with the culmen nearly straight. The tomia, or edges of both mandibles, curved inwards; the upper mandible narrower and smaller than the under one, and its roof furnished with a hard, bony, and projecting palatal knob.

There are five British species of Bunting, namely, the Snow-Bunting (*Plectrophanes nivalis*); Common Bunting (*Emberiza miliaria*); Yellow Bunting (*Emberiza citrinella*); Reed Bunting (*Emberiza schœniculus*); Cirl Bunting (*Emberiza cirlus*); and the Ortolan Bunting (*Emberiza hortulana*), which is an occasional visitant.

All these live chiefly upon seeds, of which they consume a vast quantity, seeking them upon the plants which produce them, or on the ground; but they also eat insects.

The bill of the Lark Bunting (*Plectrophanes*) is comparatively shorter, and the palatal knob less developed, than in the true Bunting. The wings are better calculated for extensive flight, being long and acuminate, and having the first quill feather the longest instead of the third. The hind claw is long, and nearly straight, as in the Larks; and the feet are adapted for running upon the ground, and not for perching. They are natives of the Arctic regions, and are driven southward only by the severity of the winter in those latitudes. One species, the Snow Bunting (*Plectrophanes nivalis*), appears annually to visit the northern portion of this island. In Northumberland, Mr. Selby observes, it rarely happens that

these birds are not annually to be met with in the three varieties of plumage which have caused them to be deemed as separate species by Montague and others, under the names of the Snow, Tawny, and Mountain Bunting.

The Snow-flake, as this bird is sometimes called, generally arrives in the upland or mountainous districts, about the middle or latter part of October, in large flocks, which seem chiefly to consist of the young of the year (or Mountain Buntings), and of females or young males (the Tawny Buntings), with a few adult males intermixed, which at this period, having scarcely acquired their winter livery, are in consequence nearer to the state of the tawny plumage. Afterwards, if the season should be severe, small flocks are seen, principally consisting of adult male birds, in their winter dress, but never in such numbers as are those in the two first-mentioned states.

As the severity of the winter increases, they leave the heaths, where they have fed upon the seeds of various grasses, and, descending to the lower grounds, frequent the oat stubbles; and, if the snow lies deep, they approximate to the coasts, where the influence of the sea-breeze soon exposes a sufficient breadth of ground to afford them subsistence. Their call-note is pleasing, and often repeated during their flight, which is always in a very compact body; and frequently, before settling upon the ground, they make sudden wheels, coming almost in collision with each other, at which time a peculiar guttural note is produced.

As spring approaches, they retire to their northern haunts to breed, and penetrate as far as the coasts of

the Polar sea—to the extreme latitude that our navigators have as yet visited. Countless thousands of them are found on the ice near Spitzbergen; and there are numbers also in Greenland. They appear, indeed, to make the countries within the whole Arctic circle their summer residence.

"The Snow Bunting," says Wilson, "derives a considerable part of its food from the seeds of certain aquatic plants, which may be one reason for its preferring these remote northern countries, so generally interspersed with streams, ponds, lakes, and shallow arms of the sea, and probably abound with such plants. In passing down the Seneca river, towards Lake Ontario, late in the month of October," continues Wilson, "I was surprised by the appearance of a large flock of these birds feeding on the surface of the water, supported on the tops of a growth of weeds that rose from the bottom, growing so close together that our boat could with great difficulty make way through them. They were running about with great activity; and those I shot and examined were filled, not only with the seeds of this plant, but with a minute kind of shell-fish that adhered to the leaves. In these kinds of aquatic excursions they are doubtless greatly assisted by the length of their hind heel and their claws." *

In size the Snow Buntings resemble the Larks; and they are caught in great numbers by the Laplanders in hair springs, their flesh being exceedingly delicate. The female builds in the crevices of rocks, constructing a nest of grass and feathers, lined with the hair and wool of the Arctic fox, or other quadruped, and lays

* American Ornithology.

about five or six reddish-white eggs, spotted with brown, and nearly spherical.

According to Wilson, the summer dress of the Snow Bunting is a tawny brown, interspersed with white, covering the head, neck, and lower parts; the back is black, each feather being skirted with brown; wings and tail, also black, marked in the following manner:—The three secondaries next the body are bordered with bay, the next with white, and all the rest of the secondaries, as well as the coverts and shoulder of the wing, pure white; the first six primaries are black from their coverts downwards to their extremities; tail forked, the three exterior feathers on each side white, marked on the outer edge near the tip with black, the rest nearly all black; tail coverts, reddish-brown, fading into white; bill, pale brown; legs and feet, black; hind claw long, like that of the Lark, though more curved. In winter they become white on the head, neck, and whole under-side, as well as great part of the wings and rump; the back continues black skirted with brown. Some are even pure white. Indeed, so much does their plumage vary, that no two are found at any time alike.

The Common Bunting (*Emberiza miliaria*) is commonly found throughout the greater part of Europe, and is plentiful in England, particularly upon cultivated lands, where, in the season of autumn, large flocks congregate together. Hedges, the neighbourhood of farm-houses, and barn-yards, are places to which they commonly resort; and by net and gun many thousands are taken for food, and considered a delicacy. When spring returns, these assembled mul-

titudes disperse themselves all over the country in pairs. They build their nest near the ground, of dry grasses, and line it with hair and dried fibres; selecting a corn-field, or, more frequently, ditch banks well protected by the brambles and briars which have been allowed to grow wild. Their eggs are of a greyish-yellow tint, very pale, spotted and veined with reddish-brown. While the female is fulfilling her vocation of hatching the young, the male bird makes choice of a lofty twig, upon a tall hedge, where he perches himself in his pride, and delights himself and his mate with his singular and somewhat irregular notes.

The Yellow Hammer (*Emberiza citrinella*), or, as it is also called, the Yellow Bunting, is beautifully and delicately coloured; it is, however, so abundant that our admiration is rarely excited by its beauty, and it is chiefly regarded by the farmer as an unwelcome intruder into the yard where his cereal crops are stacked. In winter the Yellow Buntings may be seen united in little flocks by themselves, or sometimes associating themselves with the larger bodies of the Common Bunting. The male cheers his mate, while engaged in the tedious task of incubation, in a manner similar to that adopted by the Common Bunting; and if approached, he takes his flight along the hedge, alighting at a little distance, and resuming his song; if followed, he repeats his flight. This species of the Bunting builds upon the ground, in dwarf bushes, among beds of nettles, or other low herbage, forming its nest of dried grasses, and lining it with hair. Its eggs are of a pale purplish white, streaked and covered with chocolate-coloured marks.

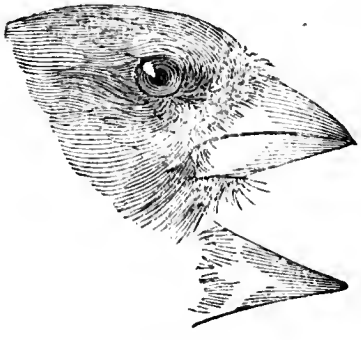
The Reed Bunting (*Emberiza schœniculus*) is found in the British Islands, and from Italy to Sweden, wherever willows and aquatic herbage, growing in swamps and marshy situations, offer a suitable abode. The nests of this bird and of the Yellow Hammer have often been mistaken one for the other; but the Reed Bunting never suspends its nest between the stems of reeds, although it frequents them: on the contrary, it is built in a low bush or tuft of grass; its materials are dry grass and moss, lined with hair. The Reed Bunting's eggs are pale pinky grey, spotted and veined with reddish-brown; it has no song; its food is chiefly seeds of reeds and other aquatic plants, insects and their larvæ; when the winter weather is severe, it resorts to the farm-yard, both for shelter and subsistence. The general colour of the bird is pale brown, the male having the head, throat, and centre of the chest, black; a patch of white, beginning below the angle of the bill, spreads round the neck, and extends down the sides of the breast and over the under surface; quills, brown; rump, bluish-grey.

The Ortolan Bunting (*Emberiza hortulana*), or, as it is commonly called, the Ortolan, is said to be strictly a native of the southern provinces of Europe. Individuals of the species have been killed in this country. Its winter residence is North Africa, and in its migratory expedition it visits Gibraltar every spring and autumn. Its food consists for the most part of millet and other grains, together with insects. It constructs its nest of fibres and leaves, lines it with fine grass and hair, and chooses for its locality

the covert of hedges or bushes, and the ground in corn-fields. Its eggs are reddish-grey streaked with brown, or bluish-white spotted with black. When this bird is fed in a proper manner it becomes very fat, and is extremely delicious. In the south of Europe there are several establishments for the purpose of feeding Ortolans with abundance of their favourite food, for the table.

In the male bird, the throat, the circle round the eyes, and a narrow band springing from the angle of the bill, are yellow, these two yellow spaces being separated by a blackish-grey dash; head and neck grey, tinged with olive, and spotted with brown; feathers of the upper parts blackish in the middle and reddish on their edges; under parts, reddish-bay; tail blackish, the external feather with white on the outer vanes; bill and legs flesh colour.

The Chaffinches and Sparrows are familiar to all. There are slight variations of form exhibited in some American species, but they are not of particular importance. We come now to the most typical of all the Finches, forming the sub-family *Coccothraustinæ*, or Hard Bills. In this division are comprised, as we have before intimated, those birds which possess the most conic, largest, and most powerful bill. They are all tree birds, seeking their food amongst the branches, or on the stems and twigs of slender weeds and plants, and not resorting to the ground like the Sparrows and Buntings. Two species well known in this country, though not



pre-eminently typical, will serve to convey a tolerable idea of the general structure of these birds. The other native birds which enter into the aberrant group are the Goldfinches and Linnets.

The powerful bill with which the typical species are provided, enables them to break the shells of the harder kind of seeds and berries upon which they principally subsist. The Hawfinch (*Coccothraustes Europæus*), for instance, feeds entirely upon the produce of various trees, such as the kernels and seeds of the beech, elm, ash, and maple; and in the winter on the berries or, rather, the seeds and stones of the juniper, service-tree, and white-thorn; it attacks also cherries and plums, the stones of which it breaks with the greatest ease, to feed upon the enclosed kernels. The species which do not possess the powerful bill of the more typical groups, such as the Linnets, Goldfinches, etc., feed upon the smaller class of seeds of wild plants, as the flax, thistle, dandelion, etc., and particularly on those of the cruciform plants.

The sub-family *Coccothraustinæ* is composed of many genera, among which the Weavers (*Ploceus*) are conspicuous for their numbers as well as their beauty. The name Weaver was given to them on account of the surprising skill that they display in the fabrication of their nests. One of these nests mentioned by Barrów* as fabricated by a species of *Loxia* or Gos-hawk (probably of the modern genus *Euplectes*), is in the form of a chemist's retort. It is usually built on the extremity of a branch extending over a river or pool

* Travels in Africa.

of water; and the shank, which is eight or ten inches long, and forms the entrance to the nest, almost touches the water. The material of which their nests are made appears to be grass or reeds, firmly put together and curiously woven. On one side of this, within, is the true nest. The bird does not build a distinct nest every year, but fastens a new one to the lower end of the old; and as many as five may thus be seen one hanging from another. From five to six hundred such nests have been observed crowded upon one tree.

These pensile nests are formed of various shapes by the different species of Weavers; and one species, the Sociable Grosbeak, by the united labour of vast numbers of those birds, forms a connected structure of interwoven grass, containing various apartments, which are all covered by a sloping roof impervious to the heaviest rain. These nests are generally formed round the trunk of some tree. The following is Le Vaillant's description of one of the nests which he examined:—"I observed, on the way, a tree with an enormous nest of these birds, to which I have given the name of Republicans; and as soon as I arrived at my camp, I despatched a few men with a wagon to bring it to me, that I might open the hive and examine its structure in its minutest parts. When it arrived I cut it to pieces with a hatchet, and saw the chief portion of the structure consisted of a mass of grass, without any mixture, but so compact and firmly basketed together as to be impenetrable to the rain. This is the commencement of the structure; and each bird builds its particular nest under this

canopy, the upper surface remaining void—without, however, being useless; for as it has a projecting rim, and is a little inclined, it serves to let the rain-water run off, and preserves each little dwelling from the rain. Figure to yourself a huge irregular, sloping roof, all the eaves of which are completely covered with nests crowded one against another, and you will have a tolerably accurate idea of their singular edifices. Each individual nest is three or four inches in diameter, which is sufficient for the bird. But, as they are all in contact with one another around the eaves, they appear to the eye to form but one building, and are distinguishable from each other only by a little external aperture, which serves as an entrance to the nest; and even this is sometimes common to three different nests, one of which is situated at the bottom, and the others, at the sides. According to Paterson, the number of cells increasing in proportion to the increase of inhabitants, the old ones become "streets of communication formed by line and level." No doubt, as the republic increases the cells must be multiplied also; but it is easy to imagine that, as the augmentation can take place only at the surface, the new buildings will necessarily cover the old ones, which must therefore be abandoned.

"The largest nest that I examined was one of the most considerable I had anywhere seen in the course of my journey, and contained three hundred and twenty inhabited cells, which, supposing a male and female to each, would form a society of six hundred and forty individuals. Such a calculation, however, would not be exact," as it appears that in every flock

the females are more numerous than the males; one male being common to several females.

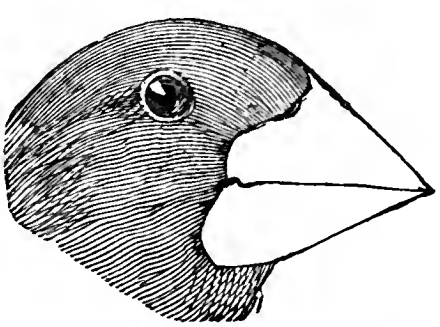
The genus *Vidua* presents us with those elegant Finches peculiar to Western Africa, and known by the name of Whidah Birds. Although little or nothing is known of their habits in a state of nature, they are the most striking of all the genera that compose the family of Weavers. They are small birds, not larger than a Canary; and the males, during the love-season, are adorned with exceedingly long tail-feathers, often four times the length of the tail itself: at this period also the general plumage becomes richer and more varied in colour. The long feathers of the tail fall off towards the end of autumn, and the plumage that is assumed at the autumnal moult is of a sober cast, and scarcely differs from that of the female.

These birds are found in various parts of the western coast of Africa, from Senegal to Angola. They appear to be particularly common in the kingdom of Whidah, in Guinea, whence they derive their name. They are also called Widow Birds, from the generic name *Vidua* or *Veuve* having been assigned to them by the French naturalists. They have much the manners, as they have, with the exception of the peculiar structure of their tails, all the organization, of the Linnets: their note is rather sharp, but agreeable and varied. In France and other parts of the Continent, they are amongst the most favourite cage birds.

Some elegant little birds are contained in the genus *Amadina*, or Bengalies; some of which, the Bronze-hooded Bengaly for instance, do not measure more

than three inches and a quarter in length. These birds have a remarkably short, thick, conic bill. They feed, it is said, upon the hard seeds of the African millet, and some other of the tall grasses, or rather reeds, so common in the swamps of that country.

The species which exhibits in the highest degree the peculiar strength and conic form of bill, so characteristic of the family, appears to be the Crimson Nutcracker, which Mr. Swainson has designated by the name *Pyrenestes sanguineus*. This bird, he observes, is the most pre-eminent type he has yet seen of this family. It may safely be affirmed, he continues, that this extraordinary bird has the thickest and most massive bill in the feathered creation. Both mandibles, indeed, are of enormous size; but, contrary to what we find in the generality of birds, the under one is still more powerful than the upper. What are the nuts or seeds, the breaking of which requires such an amazing strength of bill, is perfectly unknown; but they must be of a stone-like hardness. The sharp tooth at the base of the upper mandible is, no doubt, highly useful in this operation, probably performing the office of a canine tooth by making a first indentation in the nut, whereby to procure a hold upon it.*



The bill, it will be observed, is a perfect cone, the sides of which are quite straight, and in no wise curved outwards. The upper mandible does not project at its tip beyond the under; its margin is quite entire, excepting the short and

* Birds of Western Africa.

rather tooth-like process close to its base, while the commissure, or line formed by the joining of the two mandibles, is nearly straight; the nostrils are vertical, pierced behind the substance of the bill, but completely covered with the frontal feathers. The wings are rather short, and much rounded. The feet large and slender; the middle toe very long, exceeding with its claw the length of the tarsus; the hind claw is as long as its toe, as in many of the scansorial birds. The tail is broad, and much rounded.

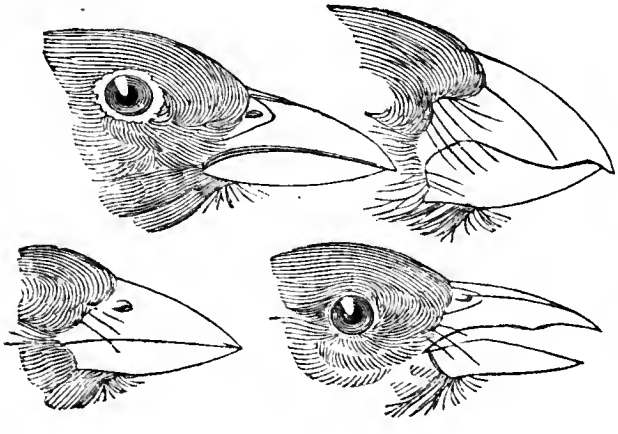
The colouring of the plumage is rich, yet simple. The feathers of the whole head, neck, breast, upper tail coverts, and half-way down the flanks, are of bright crimson, and appear glossy, as if polished, but without any coloured reflections. The tail is of a dull red, but the inner half of the lateral feathers is black; the quills are nearly so. All the rest of the plumage is a uniform sepia brown. Bill, deep black; legs, brown; claws, long, slender, and but little curved. Total length of the bird, five inches and three quarters.

In the Cardinals (*Guarica*), the upper mandible is larger than the lower, covering its margins entirely, as in the Bullfinches; its form is not so completely angular, but is very slightly curved. Red is the predominating colour of the plumage, which, in the softness of its texture, resembles that of the true Bullfinches. The wings are generally short, and the tail rather long than otherwise. The type of this division is the Red Cardinal (*Guarica cardinalis*), Cardinal Grosbeak, or Virginian Nightingale, as it has sometimes been called. Caged specimens of this species

are often imported into this country, and sold at a high price. It is eight inches in length; all the upper parts are dull dusky-red, the crest (which is long, pointed, and erectible) and the whole under parts, bright vermilion. The strength and musical power of their voice have obtained for these birds the appellation of Virginian Nightingales. Wilson says that to this name, as Dr. Latham observes, they are fully entitled, from the clearness and variety of their notes, which, both in a wild and domestic state, are very various and musical: many of them resemble the high notes of a fife, and are nearly as loud. They are in song from March to September, beginning at the first appearance of dawn, and repeating a favourite stanza or passage twenty or thirty times successively; sometimes with little intermission for a whole morning together, which, like a good story too often repeated, becomes at length tiresome and insipid. But the sprightly figure and gaudy plumage of the Red Bird, as he is commonly called in the United States—his vivacity, strength of voice, and actual variety of note, and the little expense with which he is kept—will always make him a favourite. In the Northern States they are migratory; but in the lower parts of Pennsylvania they reside during the whole year, frequenting the borders of creeks and rivulets in sheltered hollows, covered with holly, laurel, and other evergreens. They love also to reside in the vicinity of fields of Indian corn, a grain that constitutes their chief and favourite food. The seeds of apples, cherries, and of many other sorts of fruit, are also eaten by them, and they are accused of destroying bees.

In the months of March and April the males have many violent engagements for their favourite females. Early in May, in Pennsylvania, they begin to prepare their nest, which is often fixed in a holly, cedar, or laurel bush. Outwardly, it is constructed of small twigs, tops of dry weeds, and slips of vine bark, and lined with stalks of fine grass. The female lays four eggs, thickly marked all over with touches of brownish-olive on a dull white ground; and they usually raise two broods in a season.

Exclusively pertaining to the American continent is a family, or rather sub-family, of richly plumaged birds, comprising several genera and a considerable number of species. The *Tanagrinæ*, or Tanagers, compose perhaps the most numerous as well as the most diversified group of the *Fringillinæ*. There is a great diversity of form in the bill, which does not in any species exhibit that regular conic form so highly characteristic of the last group, and of the Finches in general; the culmen or upper ridge is considerably more curved than the gonys; or, in other words, the culmen is more curved downwards than the gonys is upwards. There is also a distinct and well-defined notch at the end of the upper mandible. In some species the commissure is slightly sinuated, and the sides swollen; others have an angulated or tooth-



like lobe in the middle, which folds over the edge of the lower mandible. The differences in the form of the bill are numerous; even in the same sub-genus there is a great dissimilarity between the bills of the different species.

The whole of these birds, so far as has been yet ascertained, are natives of the warmer parts of America, abounding most in those regions which lie nearest the equinoctial line. They are in general small birds, the largest being intermediate between a Sparrow and a Thrush, while the majority do not exceed the size of a Linnet; some few are even smaller. "It is quite evident," observes Mr. Swainson, "from the great strength of bill possessed by some, and the notch which is conspicuous in all, that these birds feed both upon seeds and creeping insects picked from the branches of trees; for very few of them are ever seen upon the ground. Their colours in general are bright, and, in a large number, particularly rich and beautiful. The little birds forming the genus *Aglaïa*, in fact, are ornamented with the most vivid hues, or glossed with rich reflections of gold, rendering them inferior only to the humming-birds. Some possess considerable vocal powers; and the notes of the sub-genus *Euphonia*, as its name implies, are said to be particularly musical."*

One of the most splendid of these birds is the Scarlet Tanager (*Phœnisoma rubra*), whose whole plumage, except the wings and tail, is of the most vivid carmine-red. Wing-coverts, posterior secondaries, and middle tail-feathers, black; the primaries, adjoin-

* Classification of Birds.

ing secondaries, and lateral tail-feathers, brown; insides of the wings and tail beneath, grey. Bill, pale horn-colour. Irides cream yellow. Legs, bluish-grey. The male, after the autumn moult, is dappled with greenish-yellow. The female is of a dull green inclining to yellow; the wings and tail, brownish-black, edged with green. Total length about seven inches.

This, says Wilson, is one of the gaudy foreigners (and perhaps the most showy) that regularly visit us from the torrid regions of the south. He is drest in the richest scarlet, set off with the most jetty black, and comes, over extensive countries, to sojourn for a time with us.

On or about the 1st of May this bird makes his appearance in Pennsylvania. He spreads over the United States, and is found even in Canada. He rarely approaches the habitations of man, unless perhaps to the orchard, where he sometimes builds; or to the cherry-trees in search of fruit. The depth of the woods is his favourite abode. There, among the thick foliage of the tallest trees, his simple and almost monotonous notes, *chip*, *churr*, repeated at short intervals, in a pensive tone, may be occasionally heard, which appear to proceed from a considerable distance, though the bird be immediately above you: a faculty bestowed upon him by the beneficent Author of Nature, no doubt, for his protection, to compensate, in a degree, for the danger to which his glowing colour would often expose him. Besides this usual note, he has, at times, a more musical chant, something resembling in mellowness that of the Baltimore Oriole. His food consists of large winged insects,

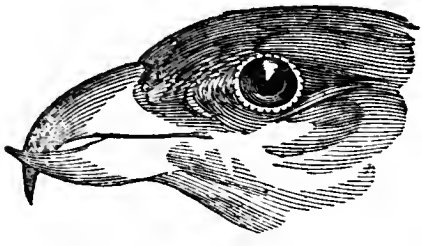
such as wasps, hornets, and humble-bees, and also of fruit, particularly those of that species of *Vaccinium* usually called huckle-berries, which, in their season, form almost his whole fare. His nest is built about the middle of May, on the horizontal branch of a tree, sometimes an apple-tree, and is but slightly put together: stalks of broken flax, and dry grass, so thinly woven together that the light is easily perceivable through it, form the repository of his young. The eggs are three, of a dull brown, spotted with brown or purple. They rarely raise more than four broods in a season, and leave us for the south about the last week in August.

Among all the birds that inhabit our woods, there is none that strikes the eye of a stranger, or even a native, with so much brilliancy as this. Seen among the green leaves, with the light falling strongly on his plumage, he really appears beautiful. If he has little melody in his notes to charm us, he has nothing in them to disgust. His manners are modest, easy, and inoffensive. He commits no depredations on the property of the husbandman, but rather benefits him by the daily destruction, in spring, of many noxious insects; and when winter approaches he is no plundering dependant, but seeks, in a distant country, for that sustenance which the severity of the season denies to his industry in this. He is a striking ornament to our rural scenery, and none of the meanest of our rural songsters.*

The last division of the *Fringillidæ* is composed of the Bullfinches, forming the sub-family *Pyrrhulinæ*.

* American Ornithology.

These birds are distinguished by a very short bill, the breadth of which is often greater than its length. The commissure of the bill, in nearly the whole of the genera, is very much curved, and the upper mandible, or rather the culmen, arched from its base. The feet have the tarsus shorter than the middle toe; and the front toes are entirely divided, Wing, short, the three first quills nearly of equal length. Their food consists principally of seeds, berries, and kernels; and though the smaller species confine themselves for the most part to grain or seeds, which they open, rejecting the husk, some of the foreign species, as Temminck observes, have the bill excessively large and strong, and capable of fracturing the most ligneous seed-cases. One genus *Loxia* exhibits a beautiful adaptation of structure to the peculiar food upon which it is appointed to subsist. The extremities of the two mandibles, which are rather long, are crossed, which enables them, by the exercise of the peculiar muscular power by which the mandibles are moved, to extract the seeds from the cones of pines and firs, on which they principally subsist. The points of the



mandible are capable of being brought together, and are then inserted beneath the scales of the fir cones: on the mandibles being closed, the scales are wrenched open by the points acting in different directions, and the seed secured and raised within the bill by means of the tongue. The mandibles are crossed in different directions in different individuals. In some specimens the upper mandible

is turned to the right, the lower being curved to the left; in others, the position of the mandibles is reversed as to their direction. Mr. Yarrell has well illustrated the structure and moving power of this organ, in an interesting paper on the subject in the "Zoological Journal." After entering very minutely into all the details of the anatomy of this very curious instrument, Mr. Yarrell quotes Mr. Townson to show the adaptation of these parts to the wants of the bird in feeding. The great pine-forests, such as the Hartz, in Germany, says Mr. Townson, are the natural place of residence of the Crossbeaks, and the seed of the cones of these trees their food; and it is to pull out the seeds from between the *squamæ*, or scales of the cones, that this structure is given them. Their mode of operation is this:—They first fix themselves across the cone, then bring the points of the maxillæ from their crossed or lateral position, to be immediately over each other. In this reduced compass they insinuate their beaks between the scales, and then opening them, not in the usual manner, but by drawing the inferior maxilla sideways, force open the scales, or *squamæ*. "It is at this stage of the proceeding," observes Mr. Yarrell, "that the aid of the tongue becomes necessary; and here, again, we have another instance of beautiful adaptation. There is articulated to the anterior extremity of the *os hyoides*, or bone of the tongue, an additional portion, formed partly of bones, with a horny covering. This is narrow and about three-eighths of an inch in length, extending forwards and downwards, with the sides curved upwards, and the distal extremity shaped like a scoop somewhat pointed,

and thin on both edges, the proximal extremity ending in two small processes, elongated upwards and backwards above the articulation with the bone of the tongue, each process having inserted upon it a slender muscle, extending backward to the glottis, and attached to the *os hyoides;* and these muscles, by their contraction, extend and raise the scoop-like point. Underneath the articulation of this horny grooved appendage," continues Mr. Yarrell, "is another small muscle, which is attached at one extremity to the *os hyoides*, at the other to the moveable piece, and by its action, as an antagonist to the upper muscles, bends the point downwards and backwards; whilst, therefore, the points of the beak press the shell from the body of the cone, the tongue, brought forward by its own muscle (*genio hyoideus*), is enabled, by the additional muscles described, to direct and insert its cutting scoop beneath the seed, and the food thus dislodged is transferred to the mouth. When the mandibles are separated laterally in this operation, the bird has an uninterrupted view of the seed in the cavity with the eye, on that side to which the under mandible is curved."*

Two species of Crossbill have been found to resort occasionally to this country, the Common Crossbill (*Loxia curvirostra*), and the Parrot Crossbill (*C. pinetorum*).

Alluding to the former of these birds, Mr. Selby says, "The visits of this curious and interesting species to our shores are at irregular periods, sometimes at an interval of many years. In the southern parts of the

* Zool. Journ., v. 4.

kingdom, during their occasional visits, they commit great havoc in the apple and pear orchards, by splitting the fruit in halves, for the sake of the enclosed pips. Their principal support, however, is derived from the seeds of the various firs."

According to Willoughby and the older authors, the Crossbill possesses a pleasant song, only heard during the winter months, which, unlike most other birds, is the season of its incubation.

It is a native of the pine forests of Germany, Poland, Sweden, and other northern countries. Its form is rather thick, and its legs strong but short, and with long and hooked claws. The muscles attached to the bill are very powerful, giving a large and disproportionate appearance to the head.

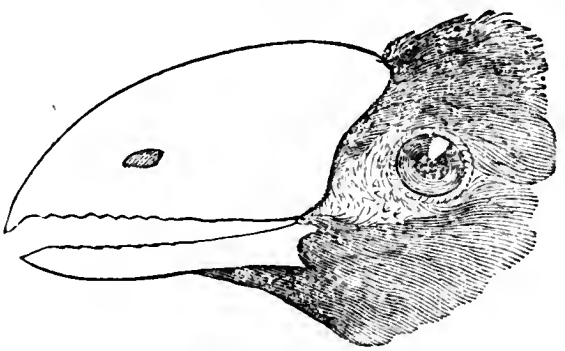
The manners of these birds are said to be interesting in confinement (to which they become speedily accustomed), climbing along the wires of the cage in any direction, by means of their bill and claws, in a similar manner to the parrots.

The Common Bullfinch (*Pyrrhula vulgaris*) is a native of the northern parts of Europe, and is only known in the more southern provinces as a bird of passage. It is stationary in our island, and very common in the mountain forests of Germany. This species is a very beautiful bird, chiefly dwelling in the wooded districts. It is retired in its habits; and throughout the winter months five or six individuals, the brood of the year, associate in families. In the spring these separate; the birds pair, and begin to form their nests. The natural song of the Bullfinch

is low, soft, and pleasing, but cannot be heard beyond a short distance. It possesses the imitative faculty in great perfection, and can be taught to whistle musical airs with remarkable accuracy. Much time is given and attention paid to the instruction of these birds in Germany; they require to be taught regularly for nine consecutive months before they can execute an air with firmness and precision; which should be uttered with a flute-like tone. Well-instructed birds sell at a high price, and are as interesting on account of their docility and affectionate disposition as their voice. The common call-note of the wild Bullfinch is a plaintive whistle.

The food of the Bullfinch consists, during summer and autumn, of various seeds; but during winter and spring it subsists for the most part on the buds of various trees and shrubs, as the thorn, larch, birch, the plum and other fruit trees, and thus often commits serious injuries in fruit gardens; the bird does not swallow the buds entire, but minces them to pieces by means of the powerful mandibles of the bill. This bird builds in low thick bushes or underwood, or on the flat foliage of a spruce or silver fir. The foundation is made of birch-twigs or other slender sticks; upon this is intertwined a basket of flexible fibrous roots, the whole forming a shallow nest. Four or five eggs, of a bluish white spotted with pale orange brown, is the usual number. The male bird has the head, wings, and tail, velvet black, with a tinge of purple; the back of the neck, and back, fine bluish-grey; rump white; cheeks, throat, chest, and sides, roseate;

the greater wing-coverts margined with pinkish-white. The plumage of the female is much duller, and the chest has only a faint tinge of the roseate hue.



The next group of conirostral birds consists of the Plantain-eaters (*Musophaginæ*). In this family Mr. Swainson includes the Plant-cutters (*Phytotominæ*), the Colies (*Colinæ*), and the Plantain-eaters (*Musophaginæ*). With the exception of but one genus, that naturalist observes, they all possess a short but very strong and thick bill, more or less curved at the top; the cutting margins being minutely serrated like the teeth of a saw; by this structure the Chilian *Phytotoma*, as we are informed by Mollini, cuts off the plants upon which it feeds, close to the ground as if it had been done by a saw.

The food of this remarkable division of birds seems to be purely vegetable, and of the most tender and delicate description: the Violet Plantain-eater (*Musophaga*) is stated by M. Isert, its first discoverer, to live principally on the fruit of the *Musa*, or plantain-tree; while the Touracco birds, according to M. Le Vaillant, feed only upon soft fruits.

In the feet of these birds we observe considerable diversity of form. In the genus *Colius* all the four toes are directed forwards; in the Touracco birds, the outer toe is capable of an outward direction, but with a more lateral or inward grasp than the inner one. In

Phytotoma, the four toes are arranged apparently like those of the Finches. One genus, *Hyreus*, possesses only three toes on each foot—two before and one behind. These various modifications of structure in the foot are adapted to different localities, plants, or shrubs, where their food is to be obtained, and where a peculiar grasping power is required.

Nearly all the species of this sub-family are natives of Africa, inhabiting chiefly close and rich woods or thickets by the banks of rivers, and nestling in the holes of decayed trees. Their habits are but imperfectly understood, their range being limited to the intertropical regions of that extensive and little-known continent.

The *Phytotomæ*, Plant-cutters, bear considerable resemblance to the Bullfinches, both in size and in their entire aspect; and from them we pass to the Colies (*Colinæ*), which have all the four toes capable of being directed forwards. All the known species are African birds, dwelling chiefly in bushes and thickets. They seldom venture out of the shade of the trees, being bad flyers, but they run along the branches with considerable dexterity. They are said to feed upon buds and fruit, and are attacked, therefore, with great hostility by cultivators. They live in societies, building their nests close to each other in the centre of some bush, as a security, it is supposed, from birds of prey.

No less attractive for their liveliness of colour, than the graceful agility of their motions, the Touracco birds are perhaps the most elegant of the *Musophaginæ*. The crest which ornaments their head and the nape of

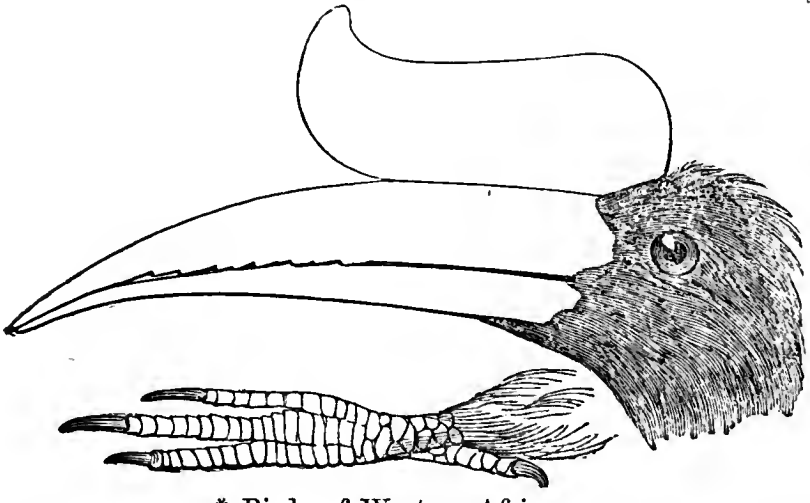
the neck, and which is capable of being erected at pleasure, adds considerably to their attractive appearance. Le Vaillant, with natural enthusiasm, extols these birds, the Senegal Touracco (*Corythaix Senegalensis*), in a state of nature, as replete with charms in all their movements and attitudes—uniting the greatest agility with perfect elegance. The colours of this species are described by Mr. Swainson as "glossy purple; head, neck, breast, and crest, green; orbits naked, red; a snowy white stripe before and partly above the eye, with a black one beneath." The bill is crimson, and the legs black. The mature bird is about seventeen inches in length.

The Violet Plantain-eater (*Musophaga violacea*) is exceeded perhaps by no other bird in the richness, depth, and beauty of its colouring. Other birds, says Mr. Swainson, are pretty, handsome, splendid, gorgeous, beautiful; but the colouring of this is regal. The shining black purple of the general plumage contrasts in exquisite harmony with the deep lilac-crimson of its wings, the peculiar tint of which is certainly unequalled in any other known bird. The beak, although remarkably large, does not seem at all disproportionate: for it is neither fantastically formed, like the Hornbills; nor monstrously large, as those of the Toucans; while the rich yellow, passing into crimson, with which it is decorated, gives a relief to the dark colour of the plumage, and must add considerably to the beauty of the living bird.

The colouring of this species is thus described: The outer half of the upper and the whole of the under mandible are of a bright crimson, blending into

a fine deep yellow on the frontal or thickest part; the orbits are entirely naked, and, with the compact velvet-like feathers of the crown, are of a glossy crimson; the ears are bordered above by a pure white stripe; the whole of the secondary and part of the primary quills are of the richest carmine glossed with lilac, more or less margined and tipped with the blackish violet which spreads over all the rest of the plumage; this violet gloss, however, becomes very dark green on the under parts, and is particularly rich on the tail. The legs are strong and black.* The base of the upper mandible is very much dilated, and spreads, like a casque or helmet, over the fore part of the head as far as the crown, where its thickened sides form a semicircle. The gape is very wide, and extends beneath the eyes. Nostrils, oval, naked, pierced through the substance of the bill, and nearer to the tip than to the eyes. The total length of the bird is about twenty inches.

In the family *Buceridæ*, or Hornbills, there is only one genus, that of *Buceros*. These birds are characterized by a bill of enormous size, the upper mandible



* Birds of Western Africa.

being generally furnished with a protuberance or knob at its base, of various shapes. In some of the species this singular appendage to the upper mandible is almost as large as the bill itself. Its use has not been ascertained. The whole of the bill, large and formidable as it appears, is weak and brittle, being cellular and light in substance. The tomia are naturally jagged, and they are often chipped into notches in the using. Their food consists of small animals, reptiles, and vegetables; sometimes carrion. The prey is swallowed whole; but previous to its transmission to the stomach, it is ground or crushed between the jagged tomia. They are said to eat voraciously, and to cast up their food into the air, catching it in its descent. They are omnivorous birds, and resemble in some respects the crows; but they are not endowed with the faculty of either perching or walking as those birds, and their feet are very different. The legs of the Hornbill are short, the tarsus being no longer than the middle toe. All the fore-toes are united at the base, and the outer is joined to the middle toe as far as the first joint. The hinder toe is the shortest, and the lateral ones unequal in size: claws short and thick. The whole limb is robust and muscular. It is neither a perching foot nor a walking foot, but simply a foot by means of which the bird can stand firmly, either on the ground or a branch. It is a gressorial foot, as it is technically called, and of the same nature as that of the Kingfisher, Bee-eater, and Tody. In these latter birds, whose feet are very small and weak, the deficiency or inferiority of form in the foot is counterbalanced by

an unusual development of power in the wing; in the Hornbills, by their superior robustness and muscular conformation of their frame.

M. Lesson sums up the habits of the Hornbills in these words:—"Those of Africa live on carrion; those of the East Indies seek for fruits, especially nutmegs, and their flesh thence acquires a delicious flavour. Their flight is performed by repeated strokes of the wings; and the air which they displace, joined to the clattering of their mandibles, occasions a great and very disquieting noise in the forests, when the cause is unknown. This noise, capable of inspiring terror, does not ill resemble those flaws of rough and sudden winds (*'grains de vent brusques et subits'*) which arise so unexpectedly between the tropics, and blow so violently. The Europeans established at the Moluccas think that the furrows which are seen on the bill of the Hornbills are the result of age, and that each furrow signifies a year; whence the name of Jerarvogel, which they give to these birds." Mr. Swainson observes that Hornbills are gregarious noisy birds, generally of a very large size, and are restricted to the Old World; that they are omnivorous, feeding both on animals and vegetables; that some, however, seem only to partake of the latter food; while others, upon the authority of Le Vaillant, feed upon carrion. The *Buceros cavatus*, dissected by Mr. Owen, was observed to be more attached to animal than to vegetable food, and would quit any other substance if a dead mouse were offered to it. This it would swallow entire, after squeezing it twice or thrice with the bill; and no castings were noticed. Mr. Owen states, however,

that Petiver has borne testimony to its regurgitating habits.

There are several species of Hornbills. All of them are natives of the warmer parts of the eastern continent—that is, of Africa, of the south-east of Asia, and of the eastern Islands. They are generally of a large size, and are gregarious, noisy birds.

The Rhinoceros Hornbill (*Buceros rhinoceros*) is a native of India and the Indian Islands, and is to be seen in most museums, specimens being often brought to Europe. Though there may be some variety from age and circumstances, the bill will be generally found to be about ten inches long, and of a yellowish-white; the upper mandible red at the base, the lower black. The horn, or casque, varied with black and white. The body black, of a dirty white below and posteriorly; tail about twelve inches, the feathers white at the base and tip, black in the middle; feet and claws obscure grey. The feathers of the cheeks and back of the neck are loose and hair-like.

The Concave Hornbill (*Buceros cavatus*) is a native of the Himalaya Mountains, India, Java, and most of the islands of the Indian Archipelago. Its food, like that of other Hornbills, consists of fruits, berries, flesh, and even carrion; in short, it may be considered strictly carnivorous.* The throat, ear-coverts, circle round the eye, and a narrow band at the occipital edge of the protuberance of the beak, black; neck, dirty straw colour, the feathers of the back of the neck elongated; body and wings black; greater coverts and quill feathers, tipped with white; thighs, upper

* Gould.

and under tail coverts, white; as is the tail also, wi... the exception of a broad black band, about thr... inches from the tip; beak, yellowish, inclining ... scarlet at the tip; under mandible, black at the bas... tarsi, black.

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